

# THE IRON AGE

Rec'd. 18  
Section Shelf

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York.

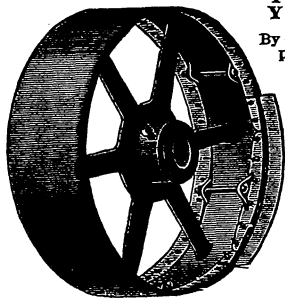
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Reading Matter Contents.....page 1009  
Classified List of Advertisers.... " 89  
Alphabetical Index to Advertisers " 93  
Advertising and Subscription Rates " 1029

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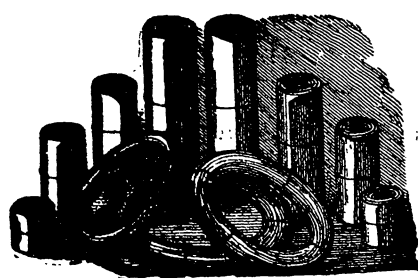
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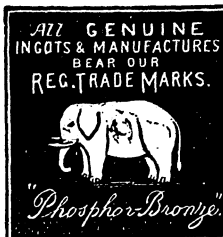
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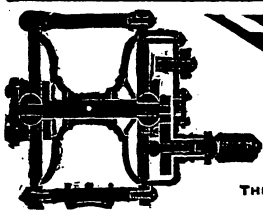
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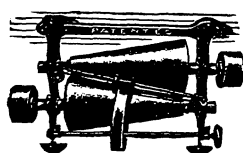
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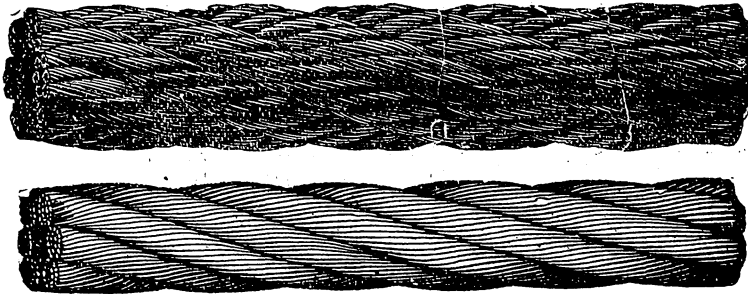
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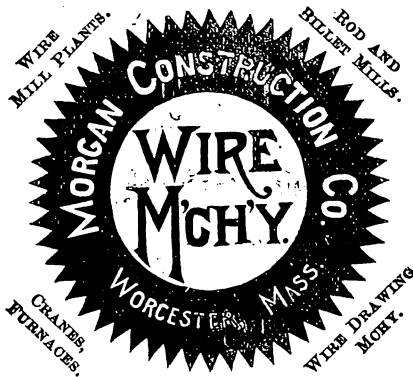
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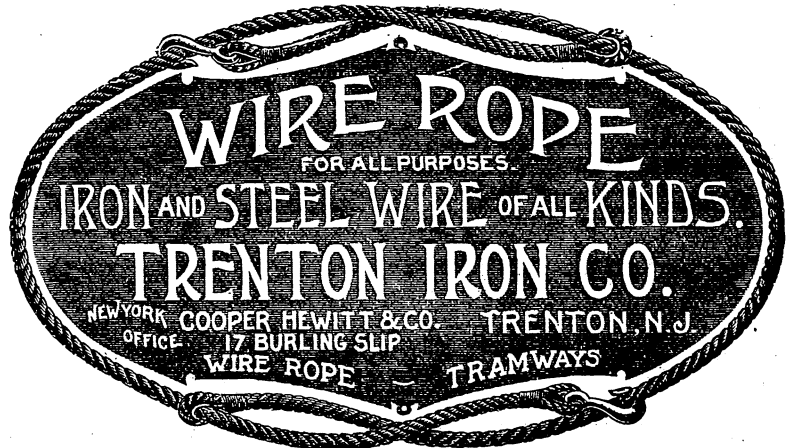
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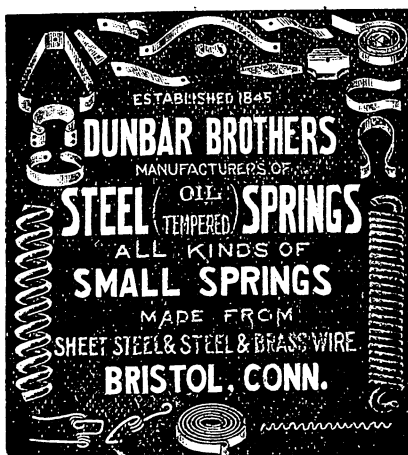


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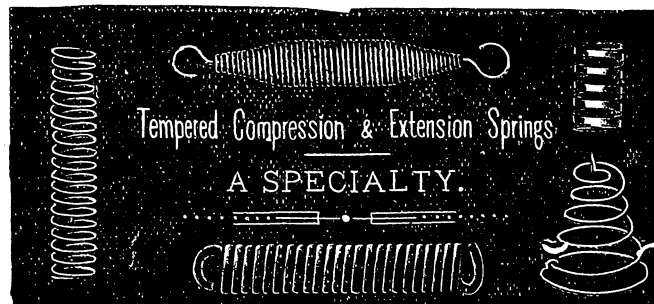


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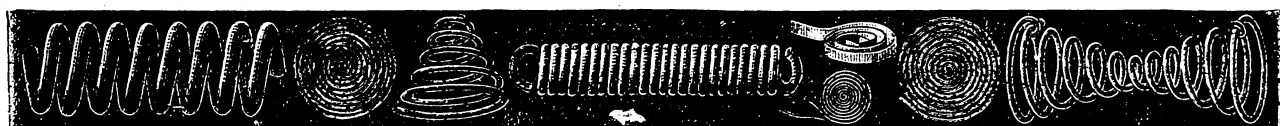
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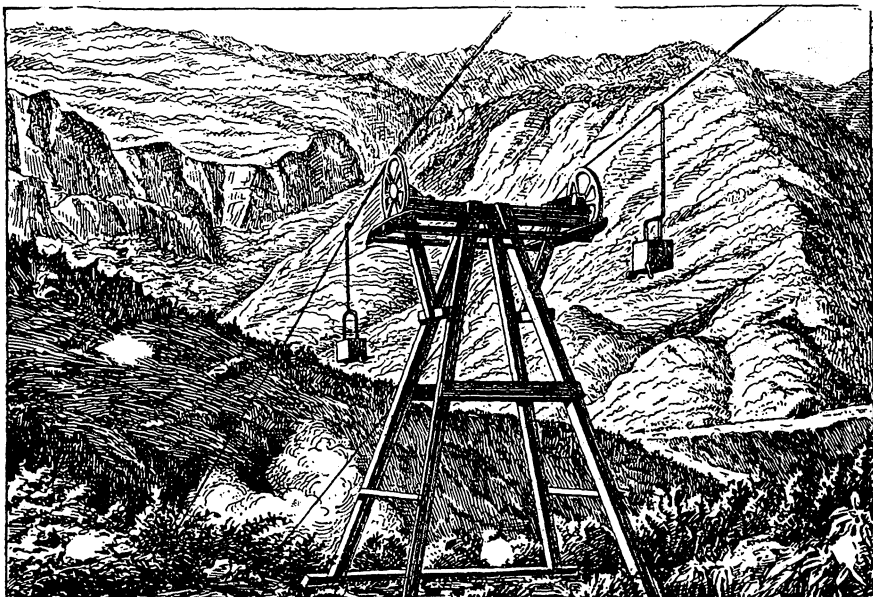
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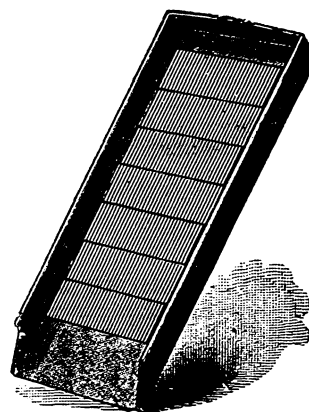
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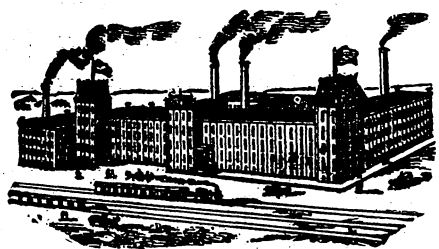
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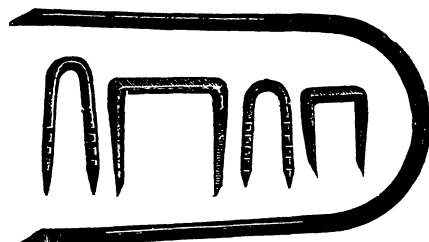
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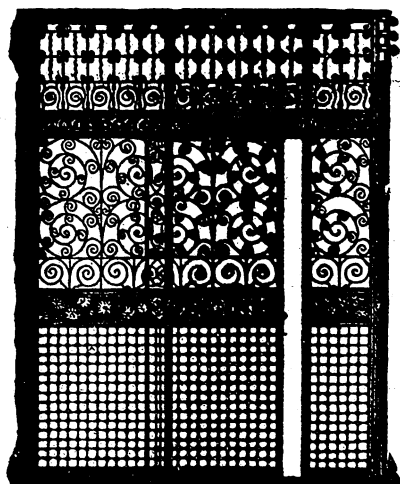
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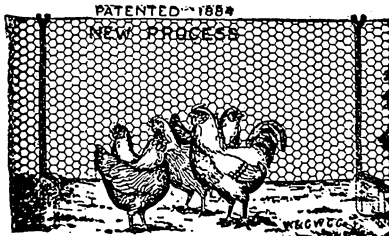
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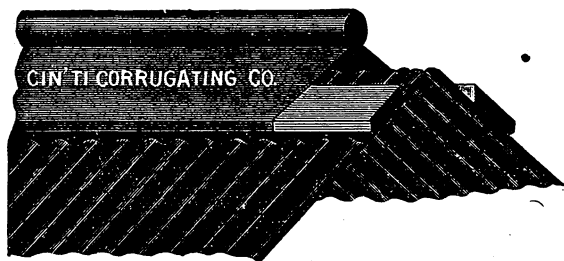
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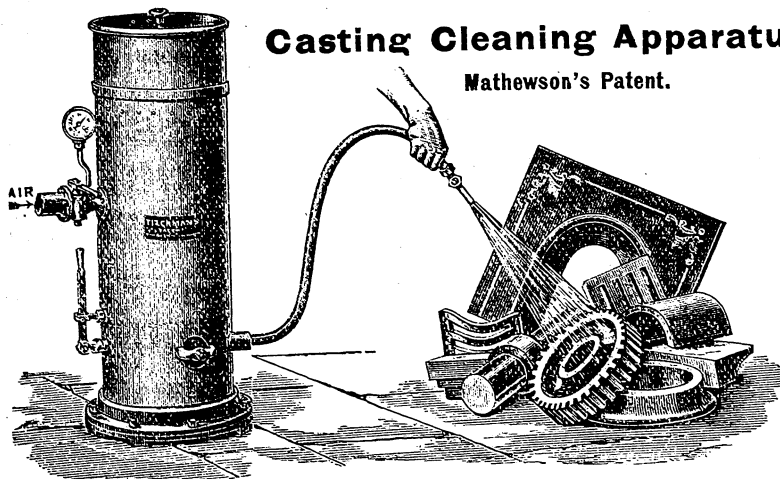


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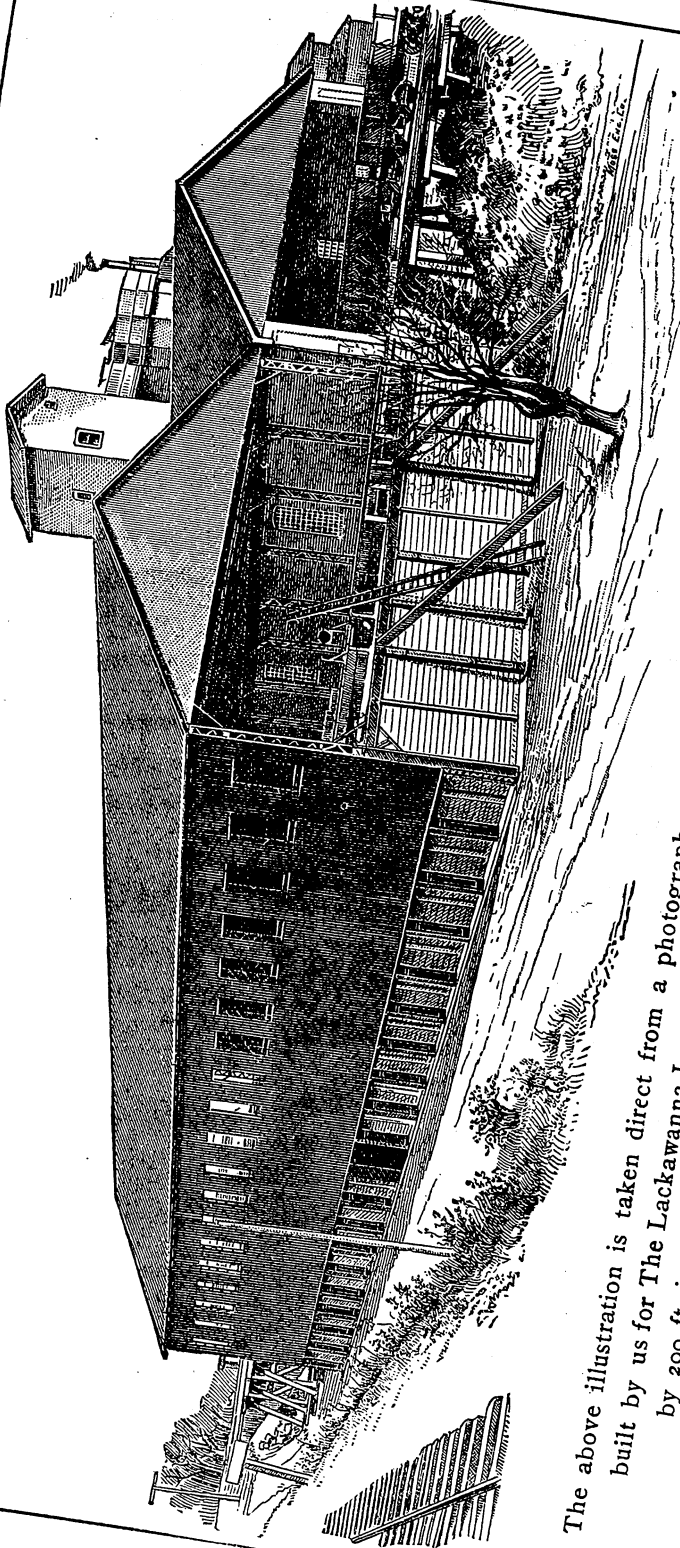
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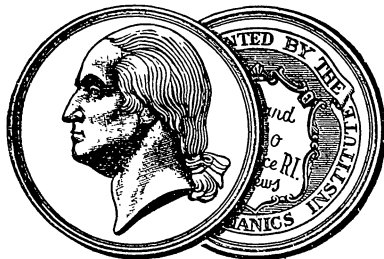
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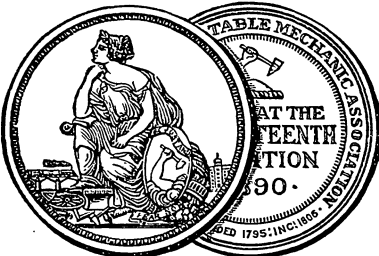
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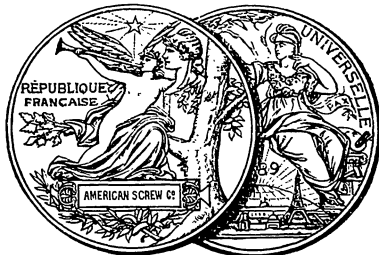
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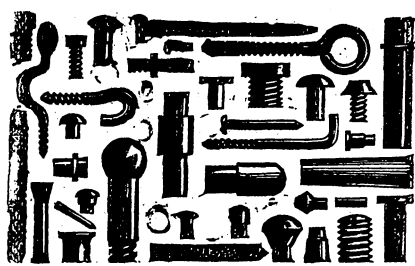
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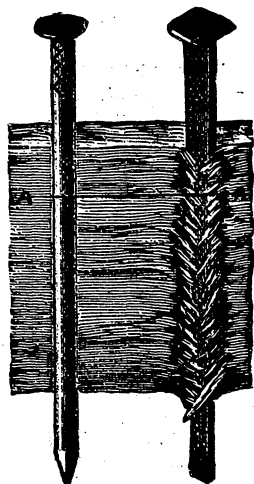
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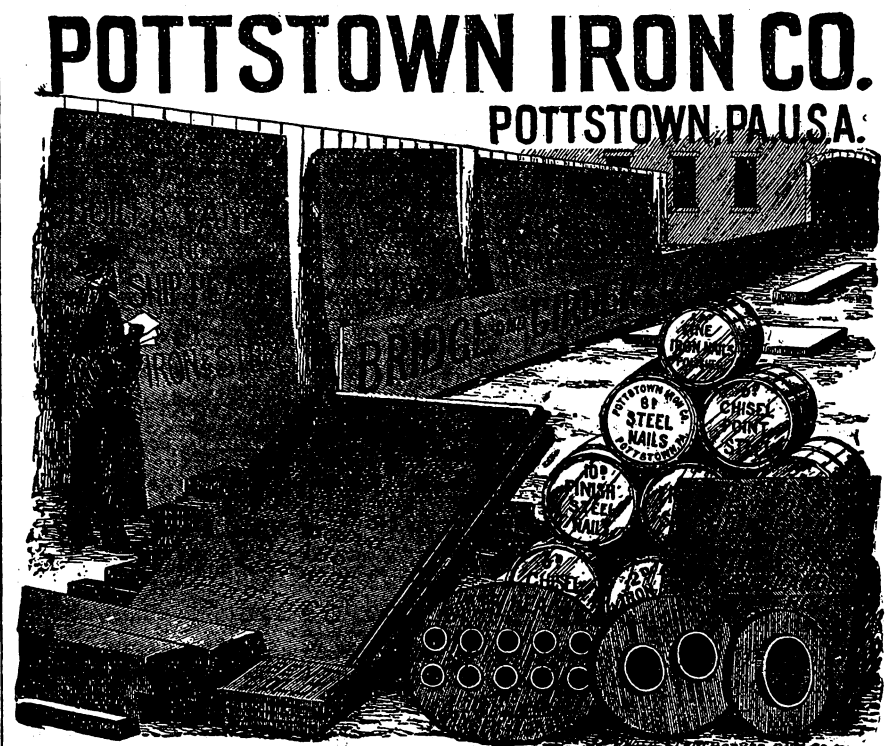


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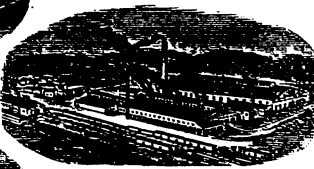
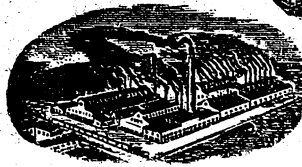
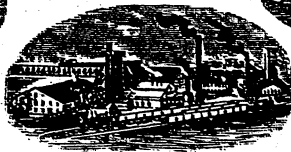
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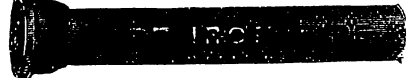
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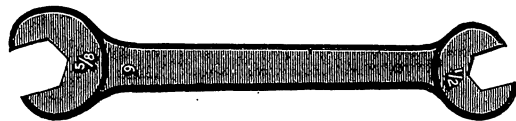
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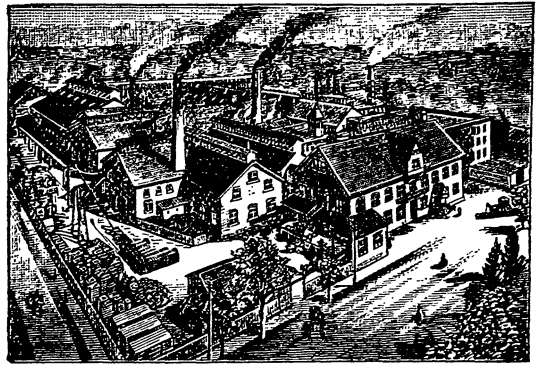
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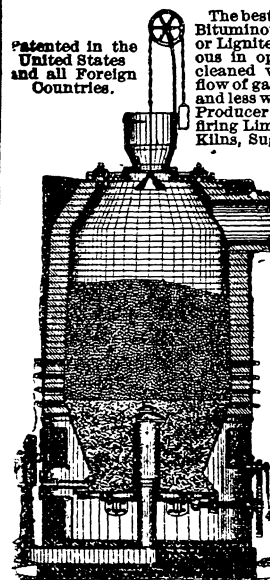
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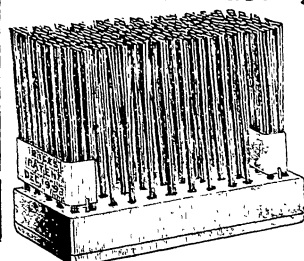
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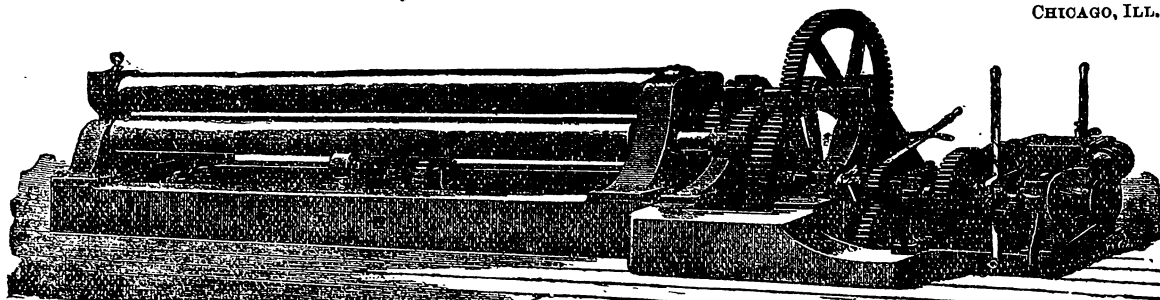
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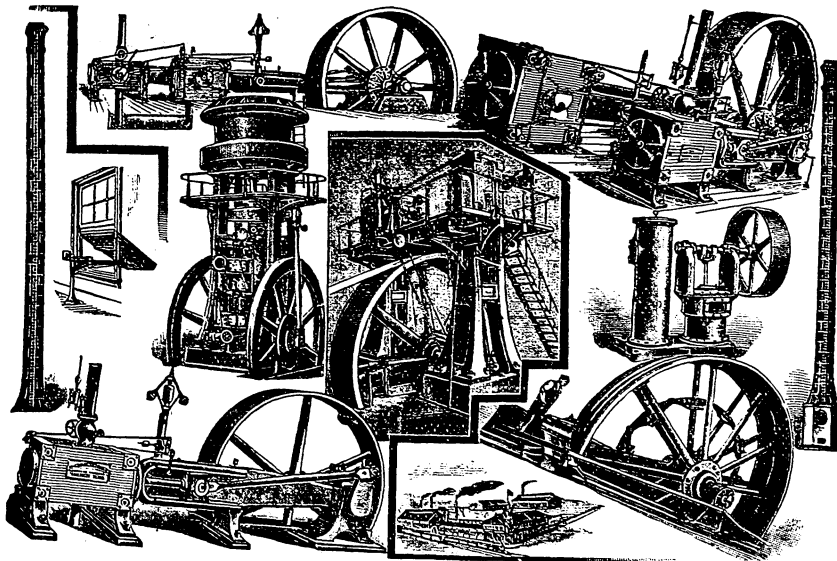
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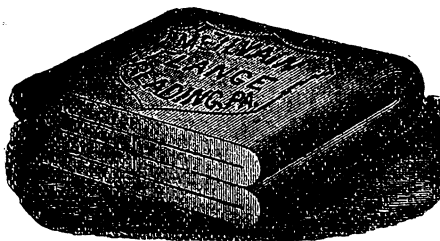
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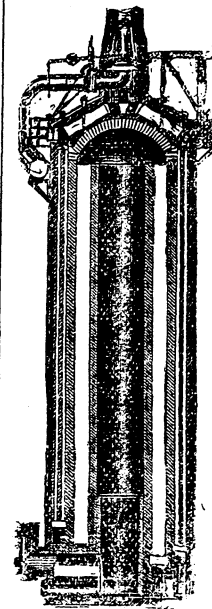
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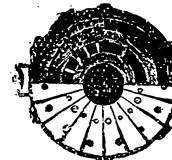
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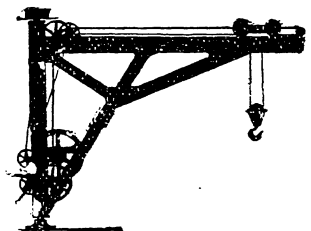
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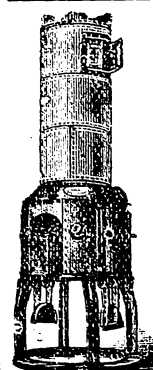
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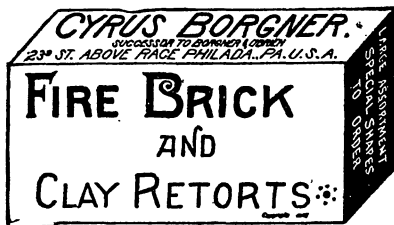
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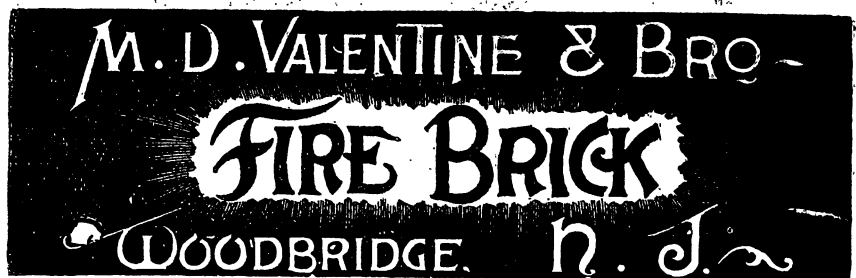
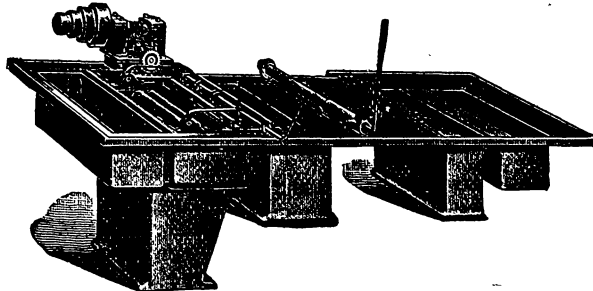
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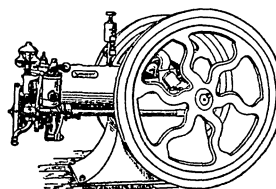
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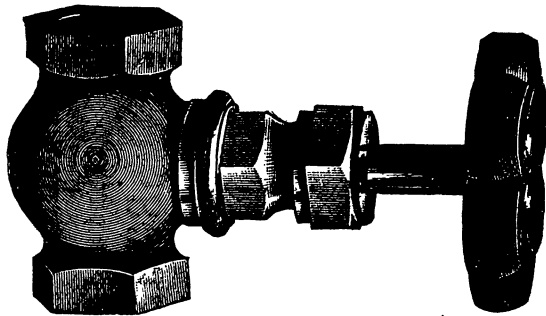
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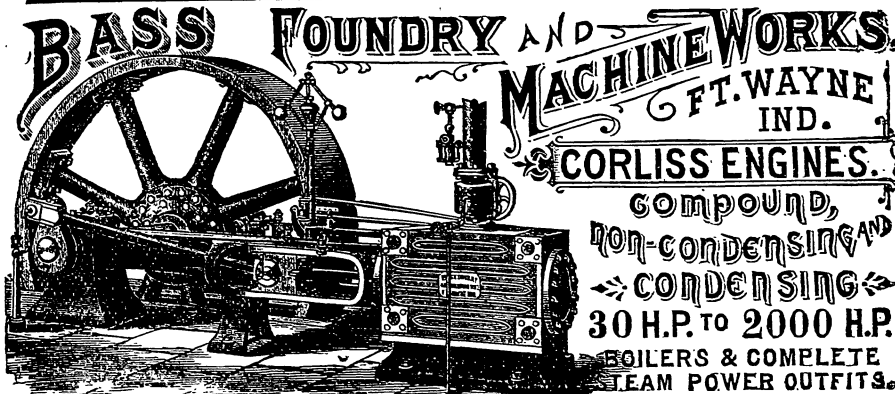
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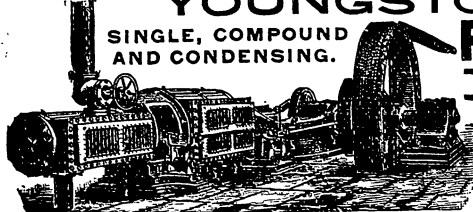
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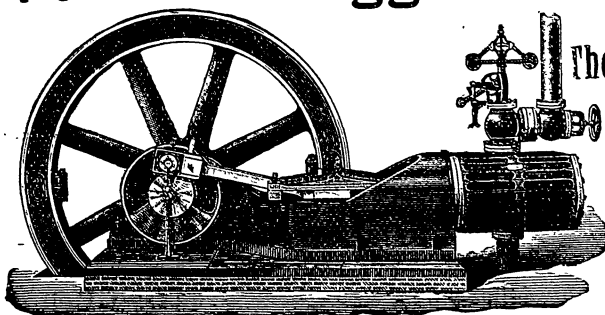
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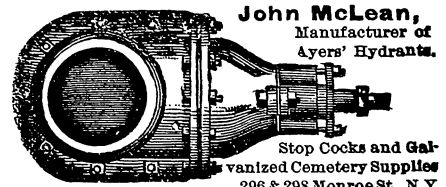
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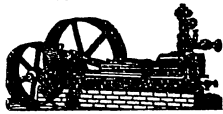
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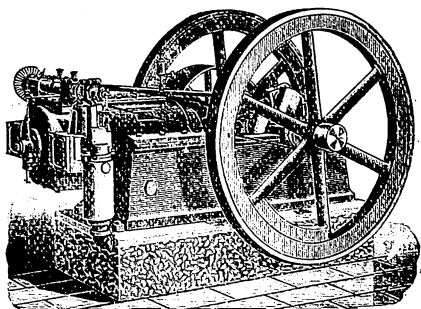
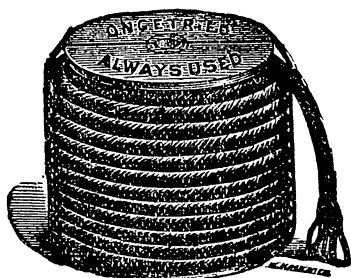
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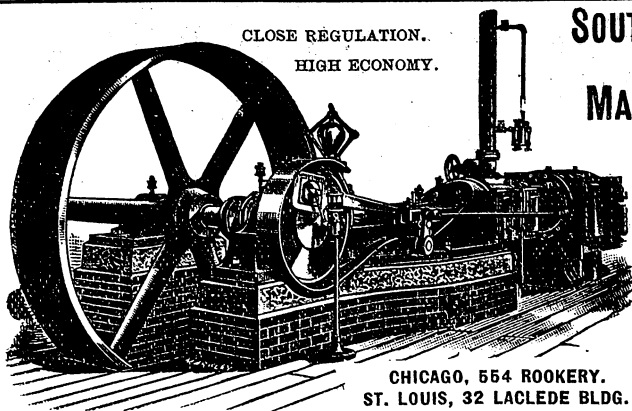
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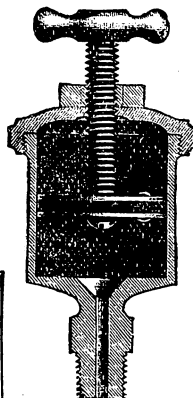
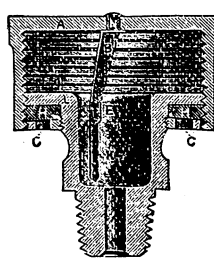
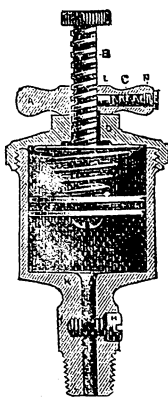
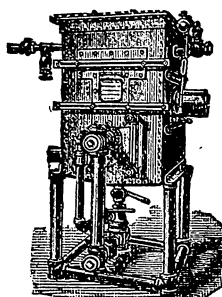
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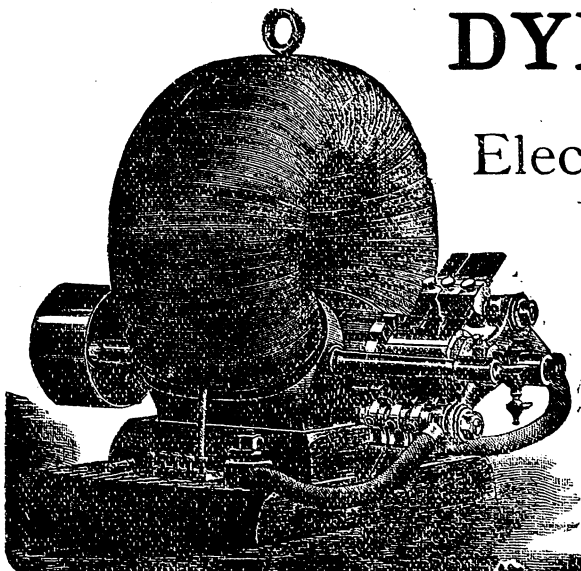
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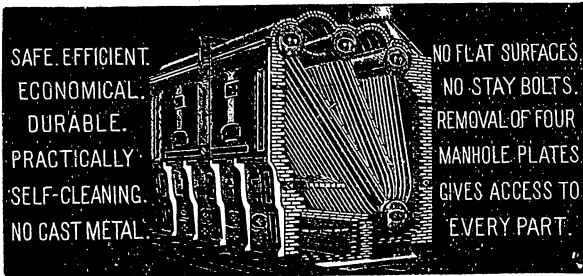
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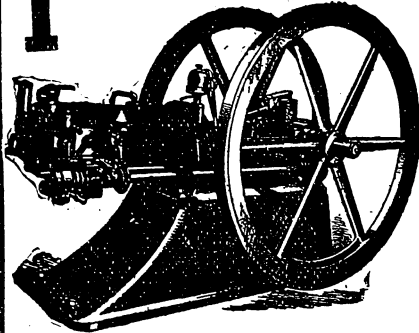


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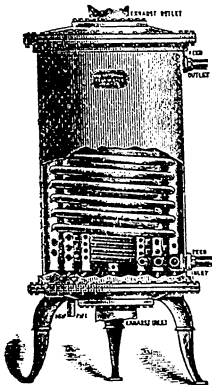
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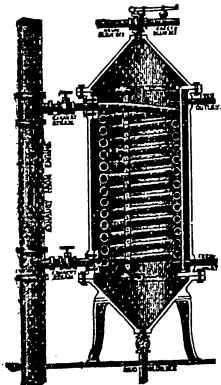
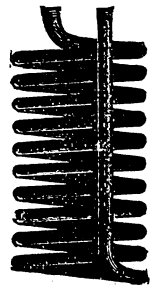


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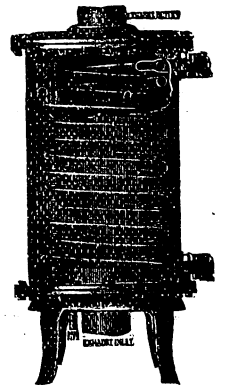
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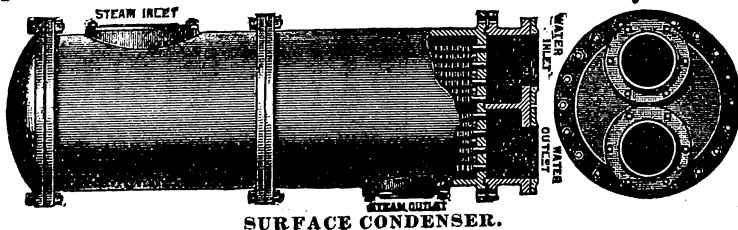
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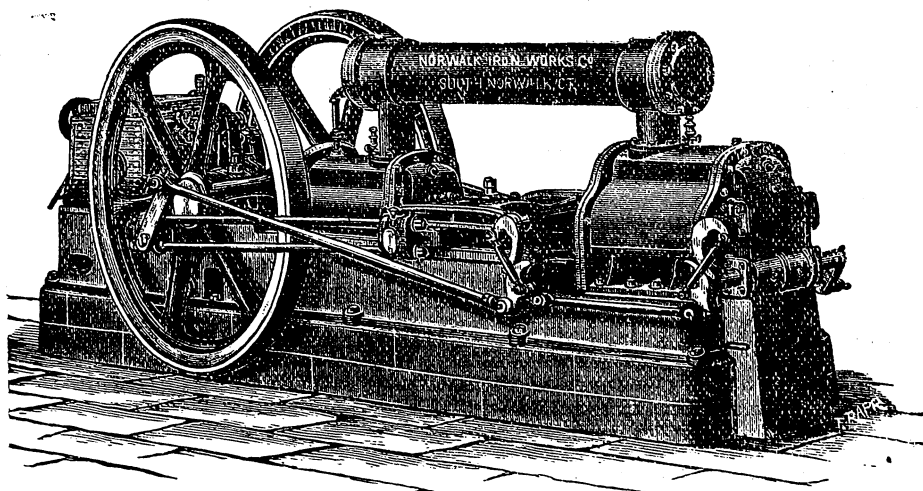
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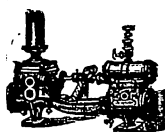


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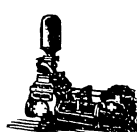
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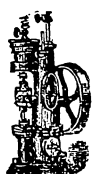
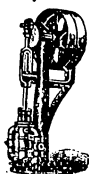
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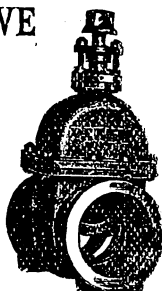
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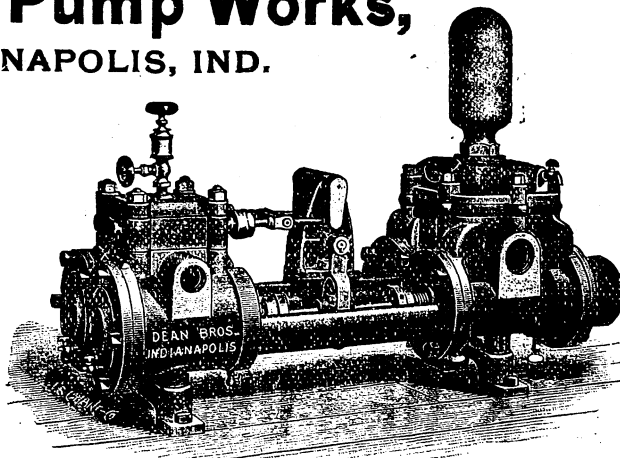
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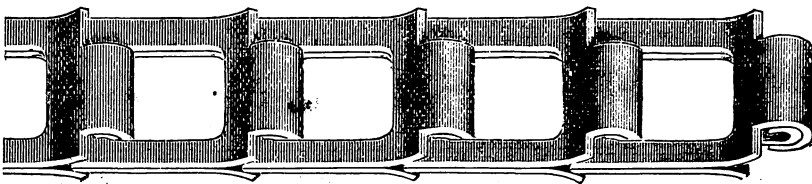
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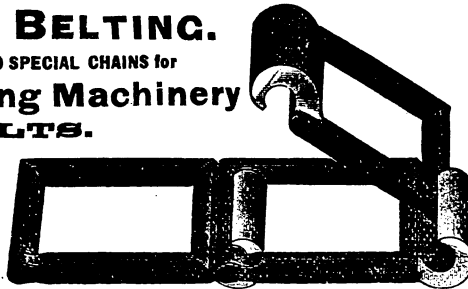
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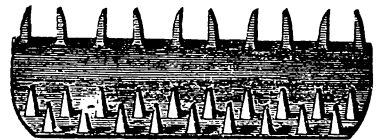
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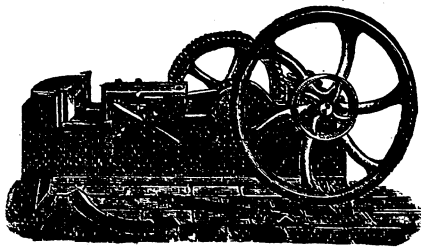
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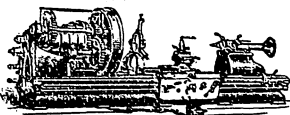
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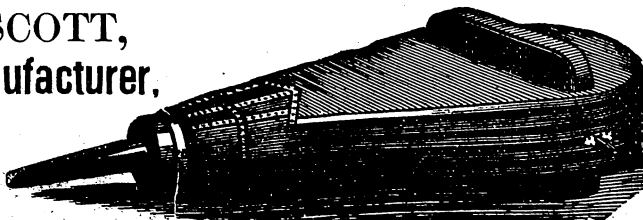
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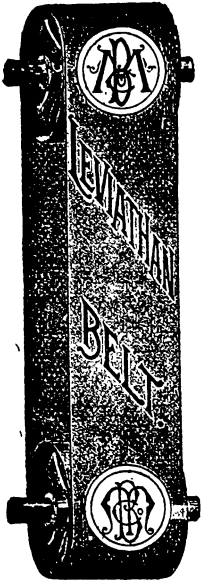
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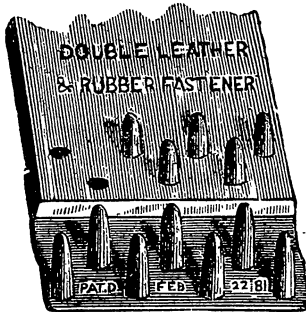
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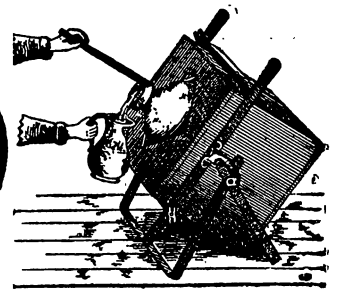
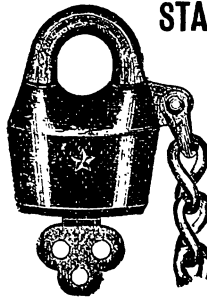
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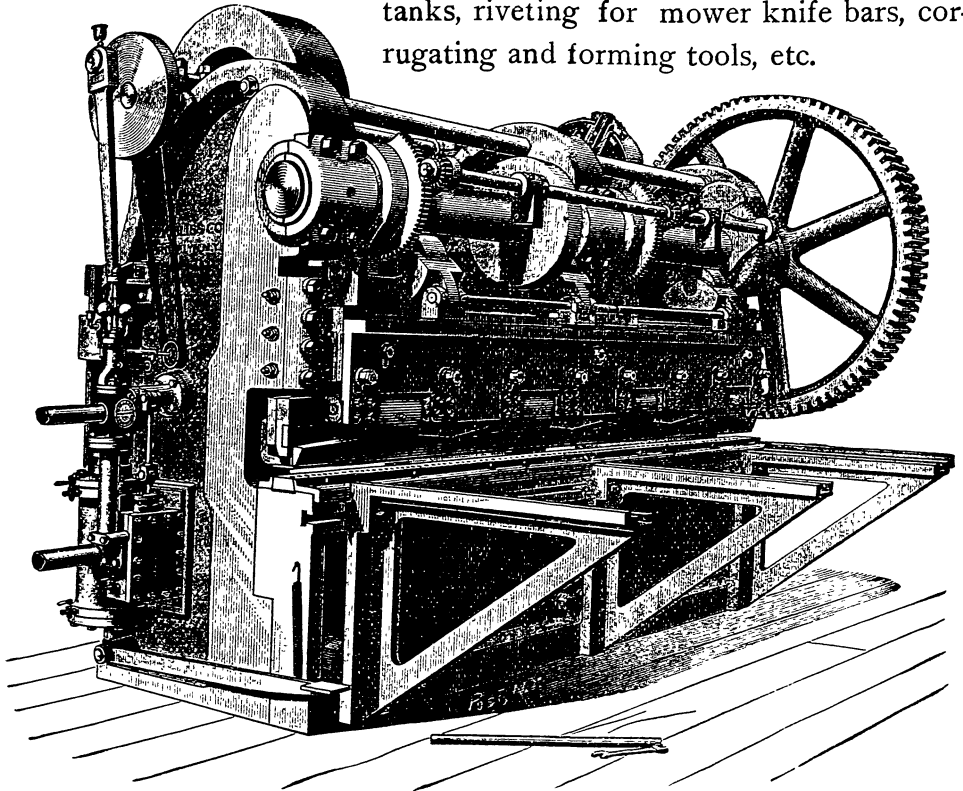
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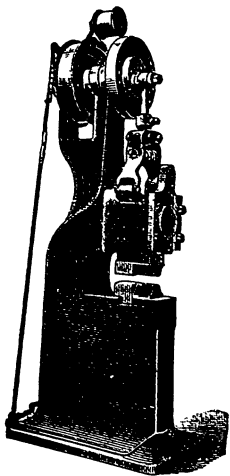


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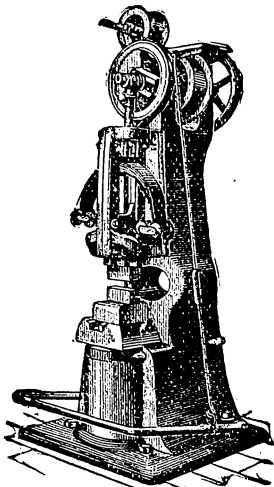
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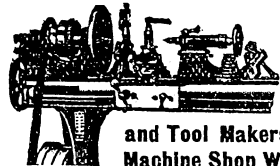
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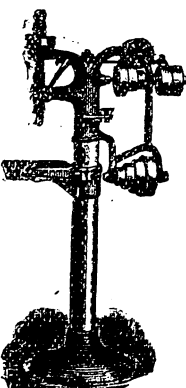
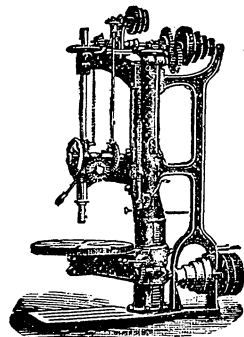
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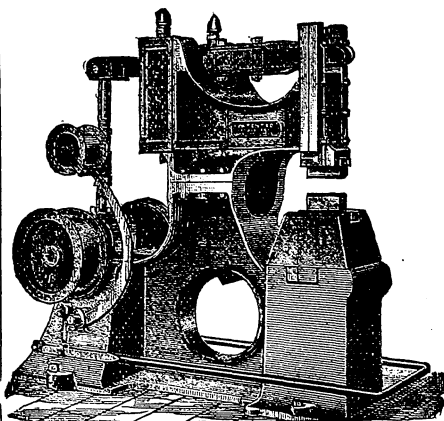
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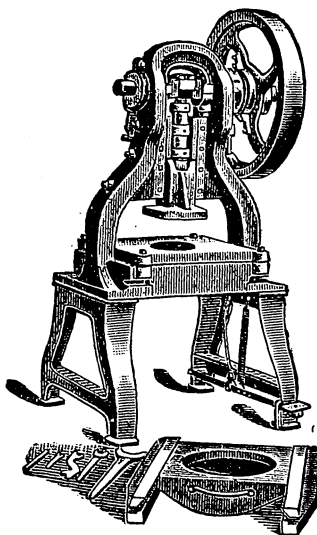
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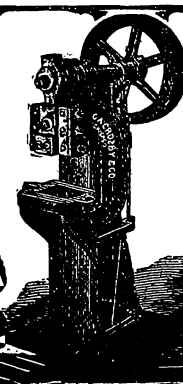
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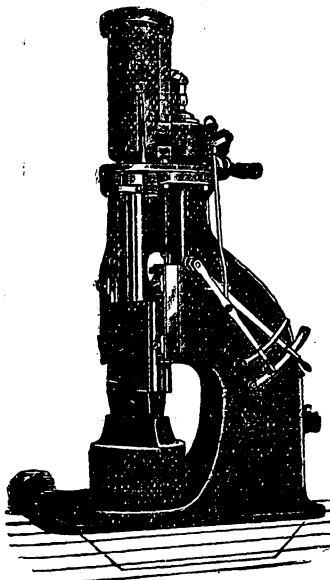


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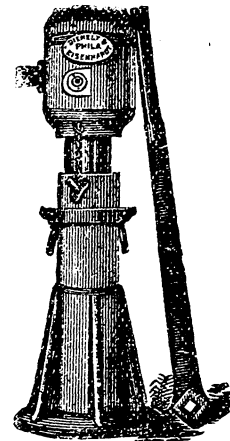
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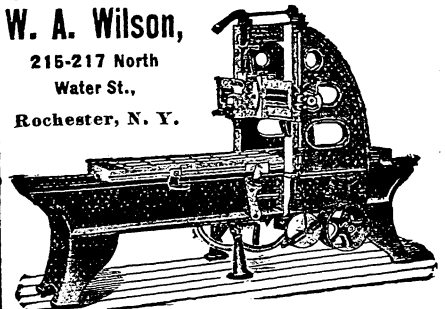
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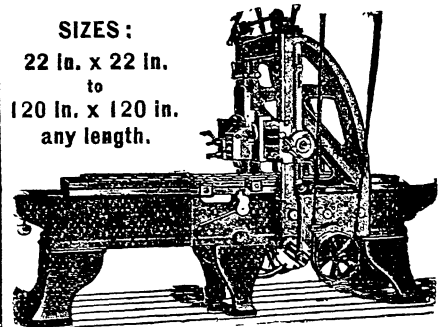
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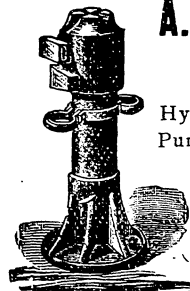
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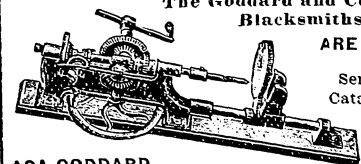
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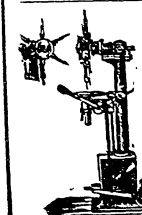


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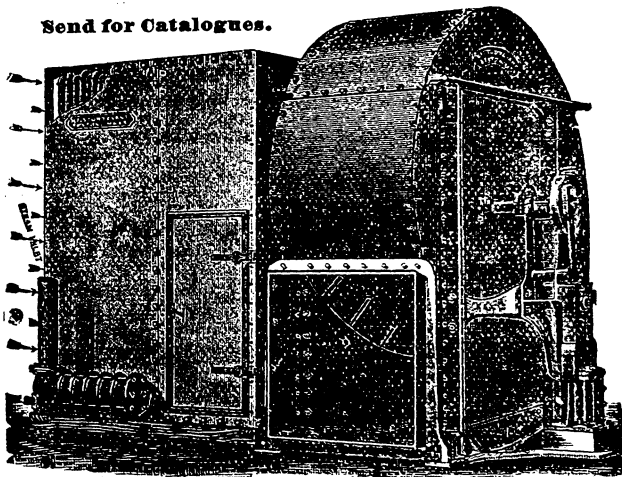
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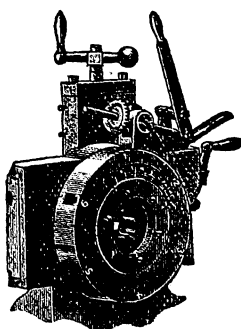
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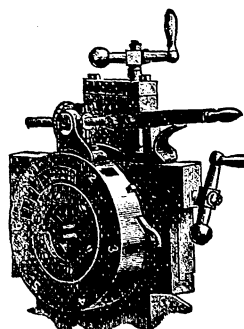
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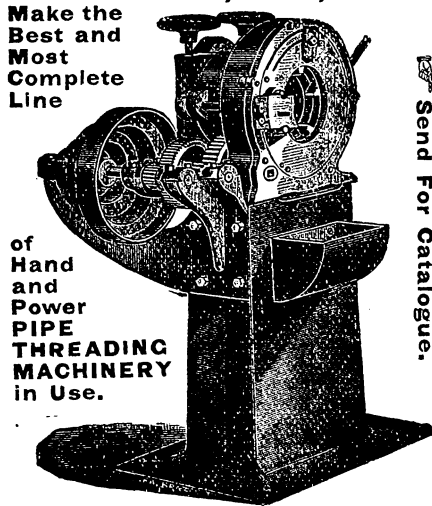
"Peerless" Head showing  
dies expanded



"Peerless" Head showing  
dies closed.

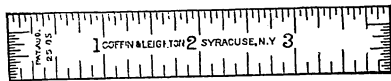
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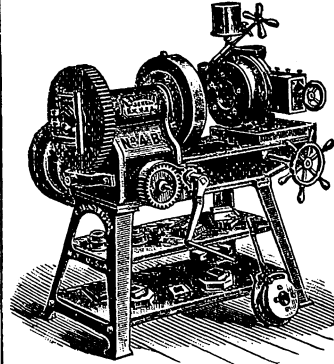
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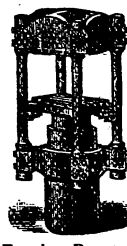
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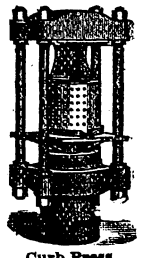
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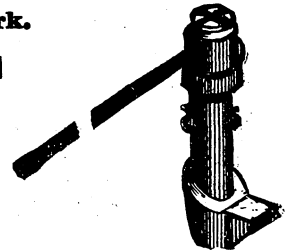
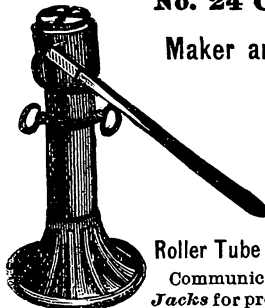
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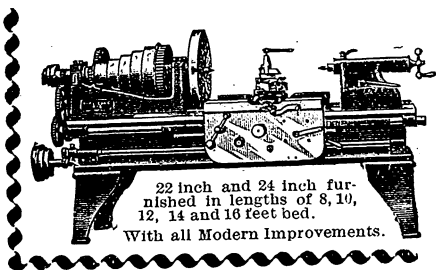
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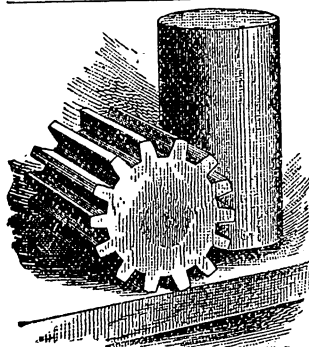
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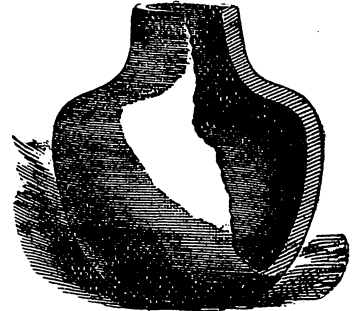


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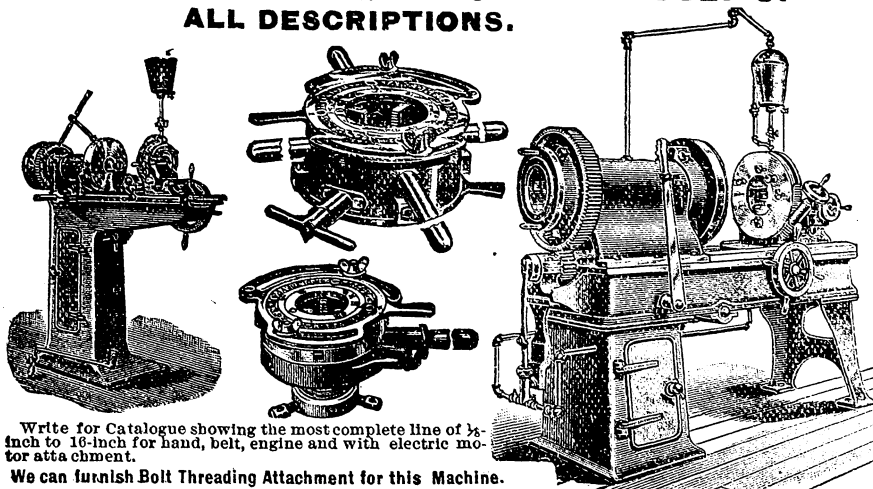
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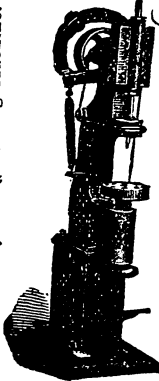
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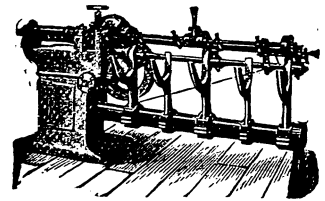
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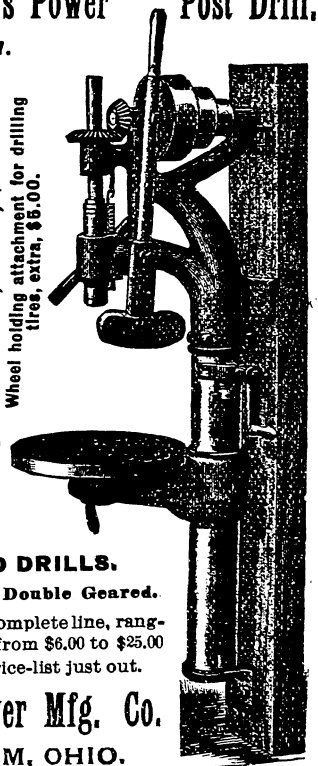
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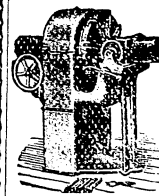
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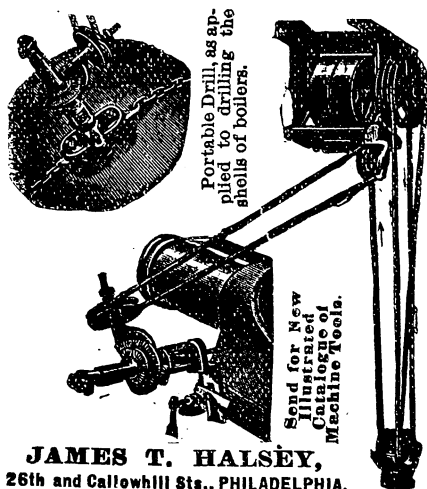
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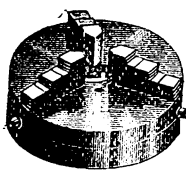
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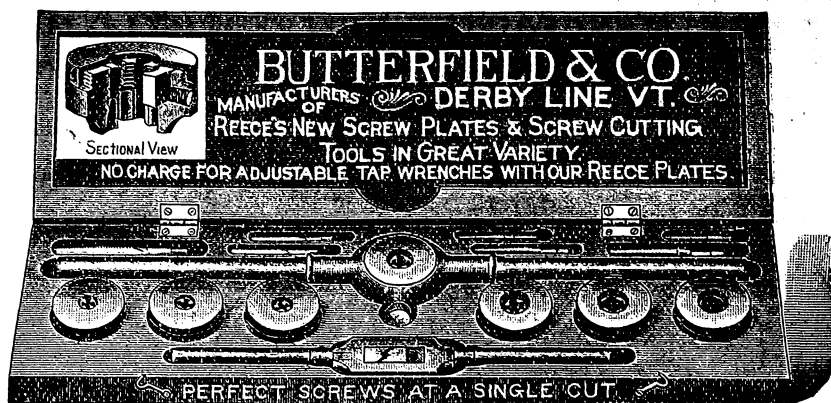
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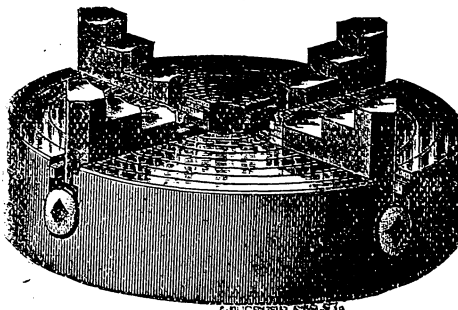
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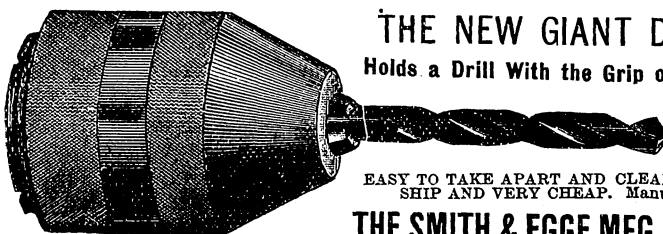
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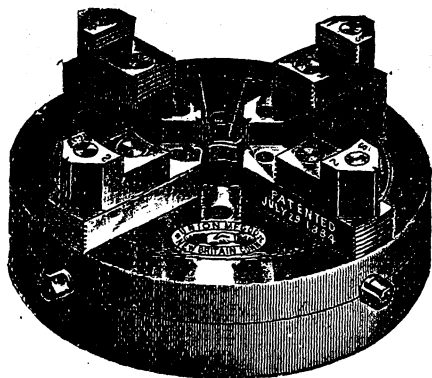
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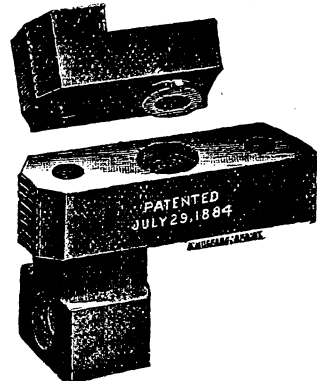
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ALSO

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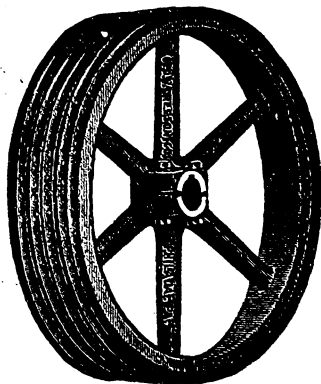
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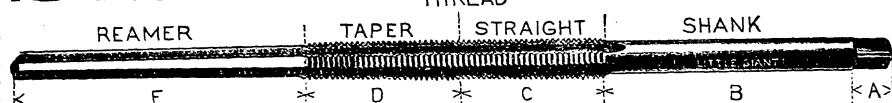
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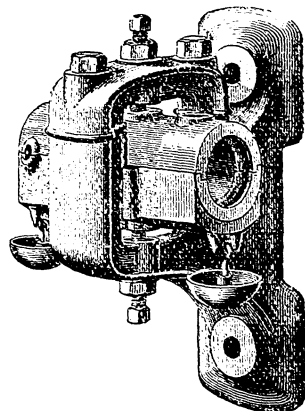
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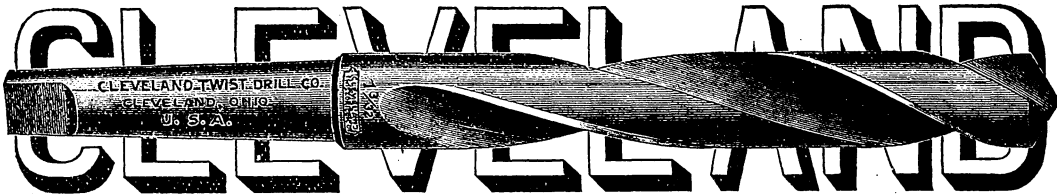
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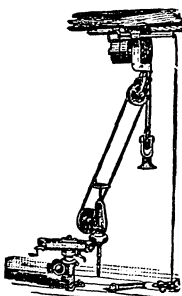
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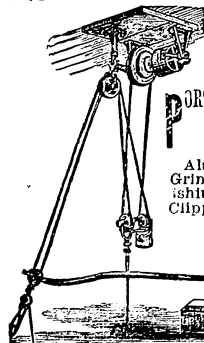
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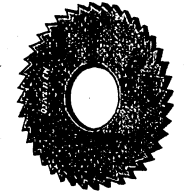
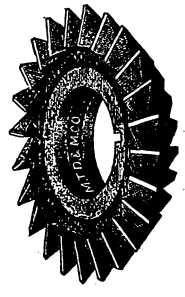
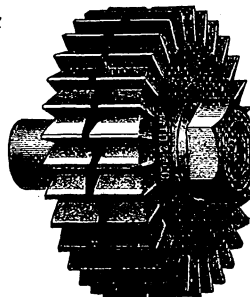
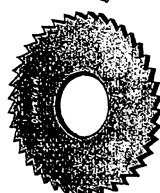
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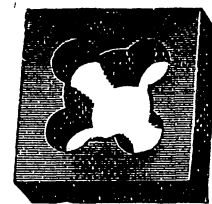


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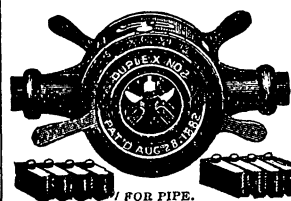


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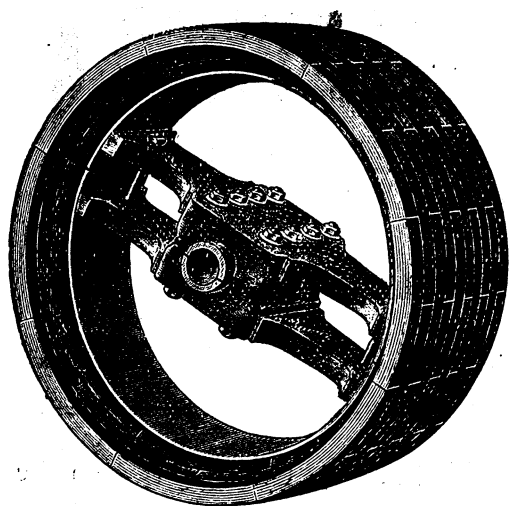
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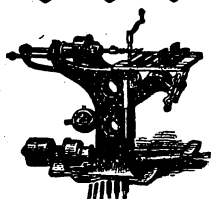
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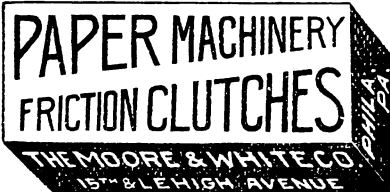
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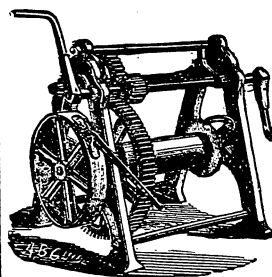
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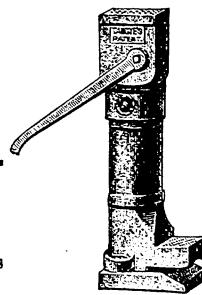
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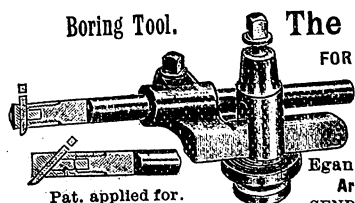


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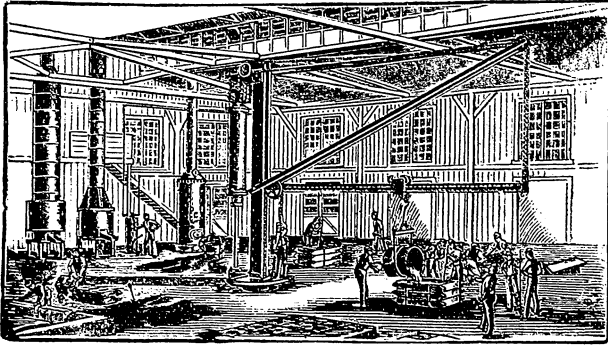
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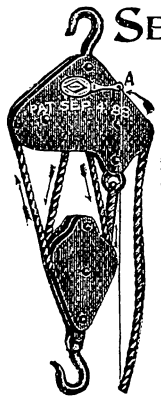
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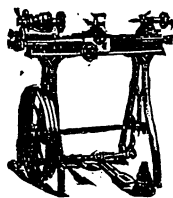
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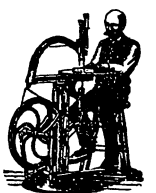
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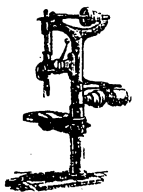
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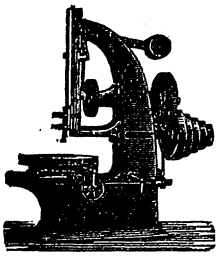
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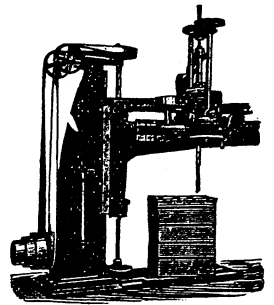
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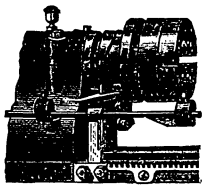
Prices, Descriptive Matter, &c., Furnished on Application.



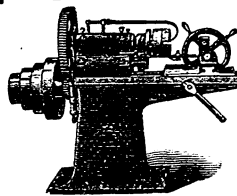
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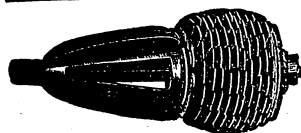
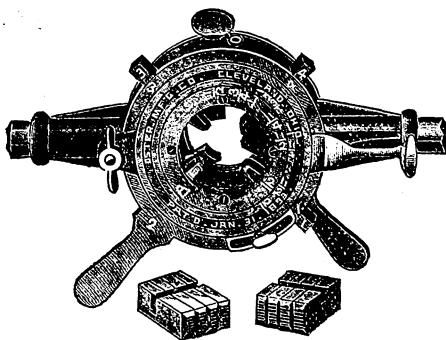
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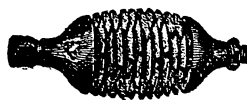
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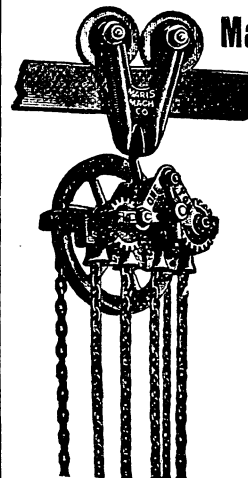
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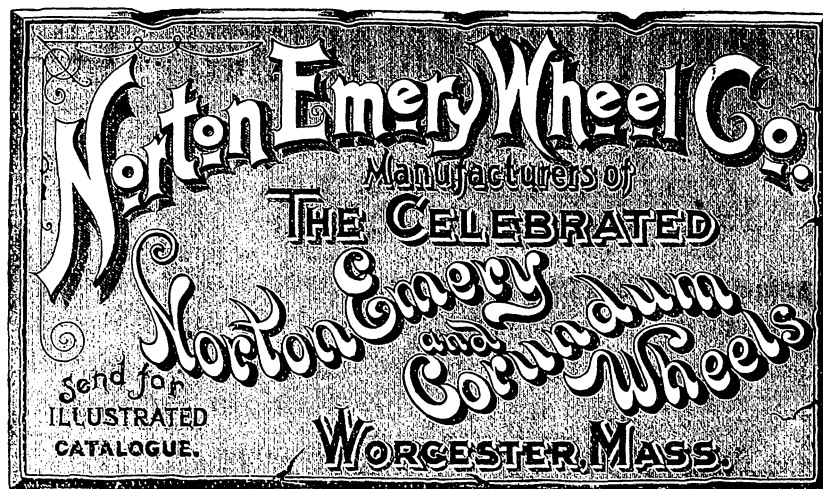
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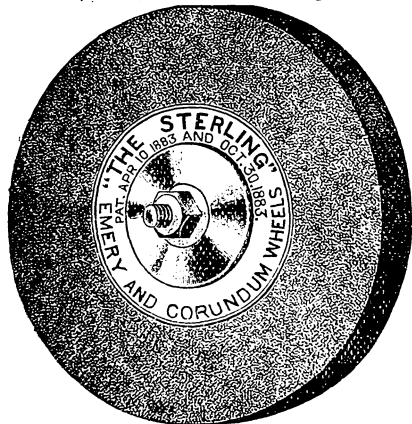
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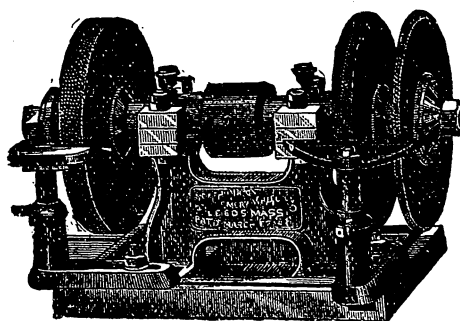
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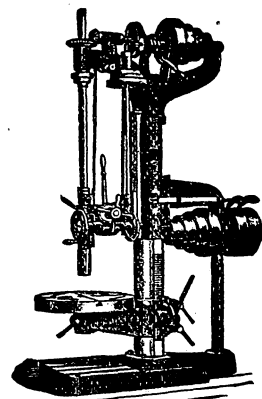
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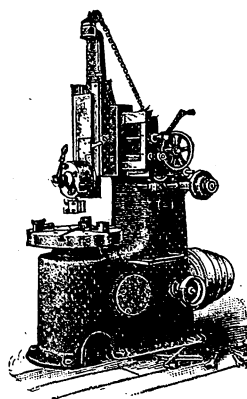
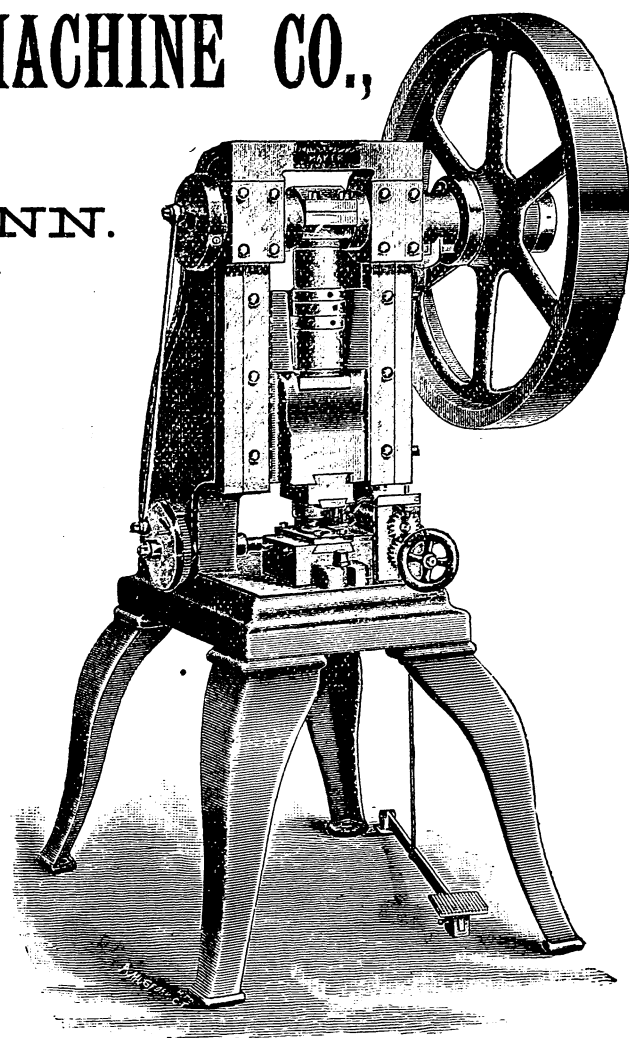
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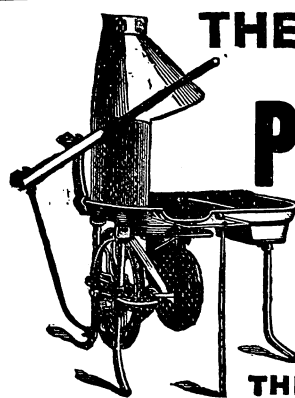


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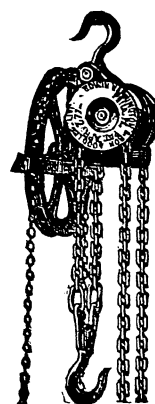
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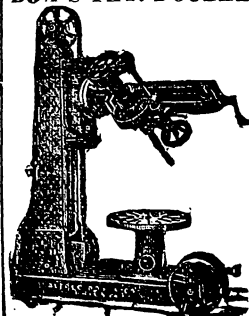
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2 Double Deck Boilers about 40 H.-P. each.  
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Good Second-hand Improved Ma-  
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Portable, Tubular and Vertical Boilers of all  
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A full line of the most improved Turret Lathes and  
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Height, 8 ft. 2 in.  
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24 x 48 Miller & Allen Corliss Engine.  
16 x 36 Slide Valve Engine.  
16 x 24 " " " New.  
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Upright Fitchburg Engine, 16 x 20 in.  
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**DON'T LOOK ANY FURTHER FOR BARGAINS.**

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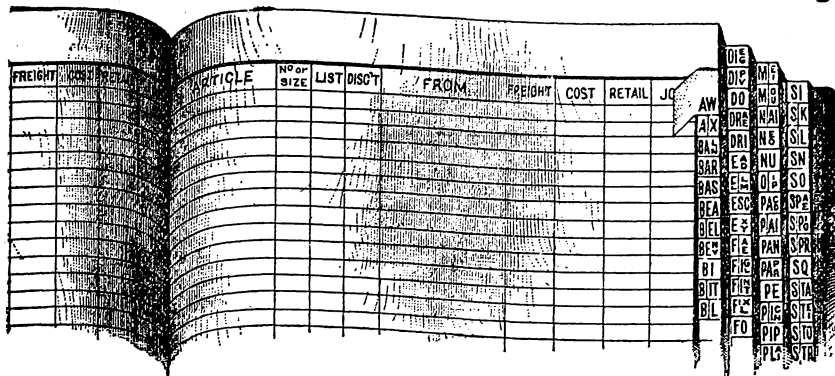
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AW DR<sub>2</sub> N<sub>0</sub> SN  
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BA<sub>1</sub> E<sub>D</sub> O<sub>P</sub> SP<sub>A</sub>  
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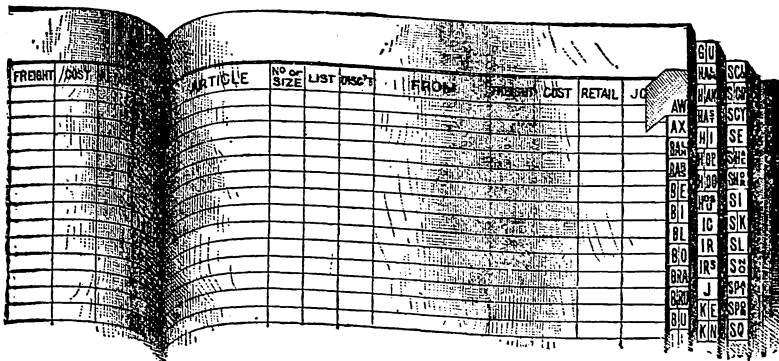
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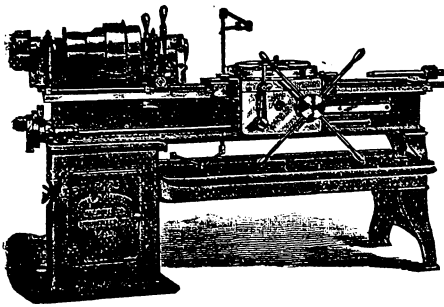
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We are especially equipped for heavy and light castings, prompt production and shipment, and have unsurpassed facilities for making the best quality of

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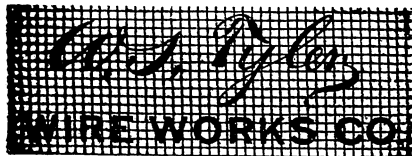
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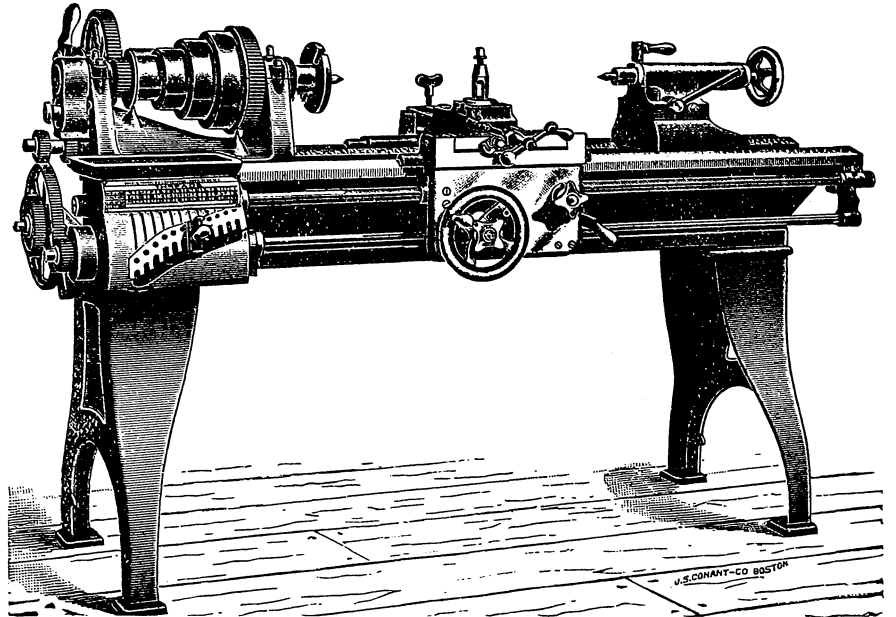
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As the Stearns does in every event in which it competes,  
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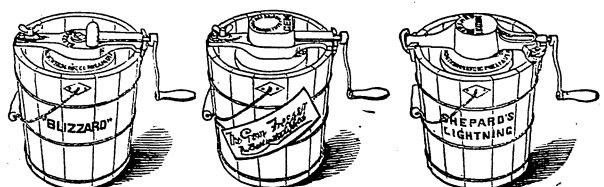
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HAVE Pails made of Virginia White Cedar with Electric Welded Wire Hoops, Guaranteed not to fall off.

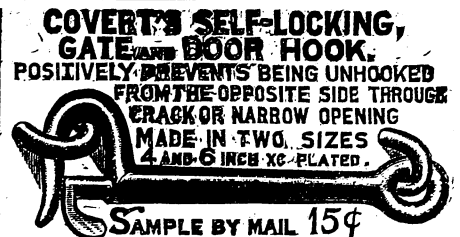


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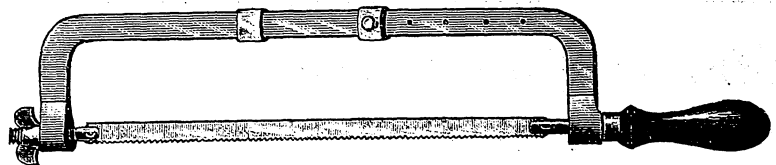


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Always Clean. Indestructible.  
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Length, 6 in., \$0.55, 7 in., \$0.60, 8 in., \$0.65, 9 in., \$0.70, 10 in., \$0.85, 11 in., \$0.95, 12 in., \$1.05 per dozen.

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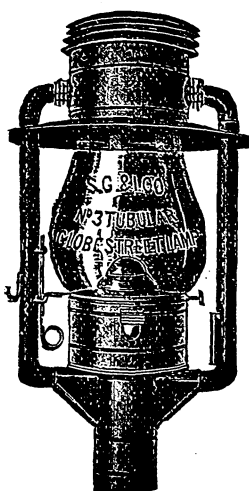
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We also make a frame for the Hack Saws, so as to run them by power. No more valuable machine has been offered to iron workers for many years, and thousands of them are now in use. Price, \$25.00.

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Light your Streets and Driveways.

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## Tubular Globe Street Lamp

IS THE Best Street Lamp Manufactured.  
Equal to the best Gas Light.  
Will not Blow Out in the Strongest Wind.  
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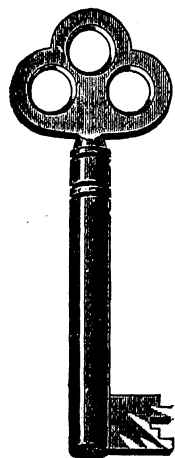
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OF EVERY KIND.



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Don't let your customers go to another store for what they want, but **SELL THEM WHAT THEY ASK FOR**.

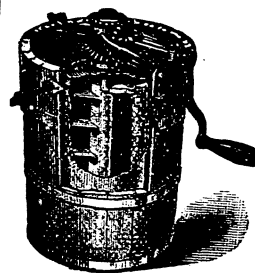
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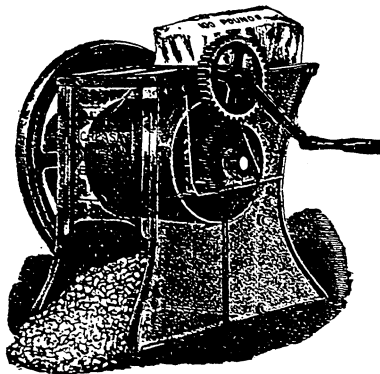
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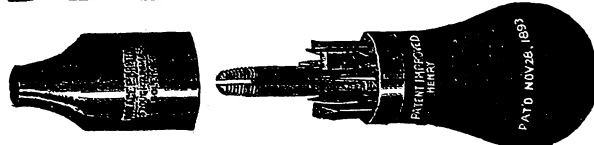
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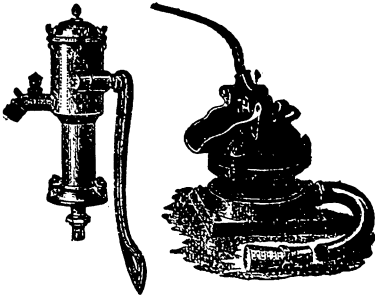
A LARGE CAPACITY AND EASY WORKING PUMP FOR

Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries;

Fig. 209.

Fig. 381.

Fig. 145.



or wherever it is desired to raise a large quantity of water by  
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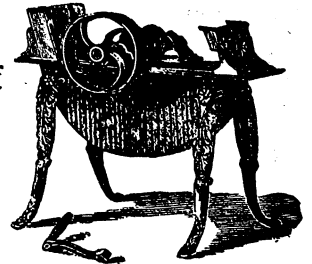
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These pumps are simple, durable and low priced.  
Made either as shown in out for Hose or for IRON Pipe Suction underneath.

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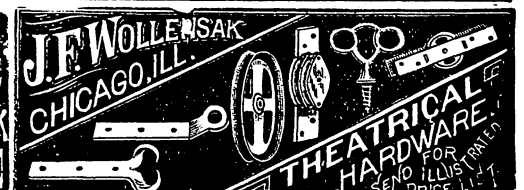
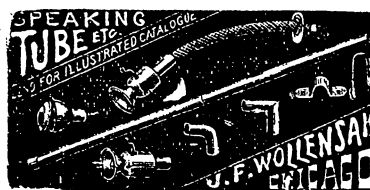
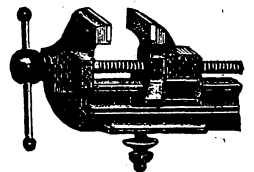
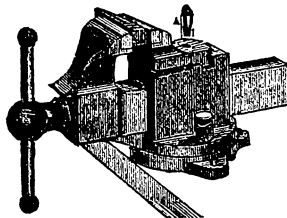
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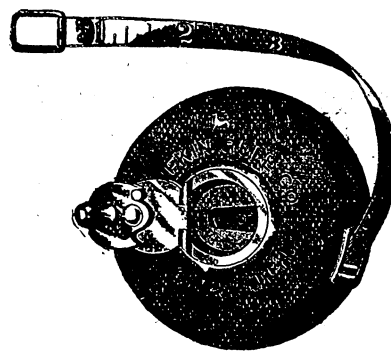


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Thousands in use. Catalogues on application.  
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A 7-SHOT, 32 CALIBRE, STANDARD CARTRIDGES.

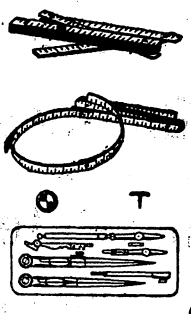
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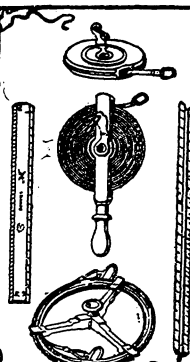
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BRANCH: CHICAGO.  
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**MANUFACTURERS OF EXCELSIOR MEASURING TAPES.**  
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 EXCELSIOR BAND CHAINS FOR SURVEYORS, LAND CHAINS, &c.  
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 NO WARPING, NO SHRINKING, NO ILLEGIBLE JOINTS, NO BULK.  
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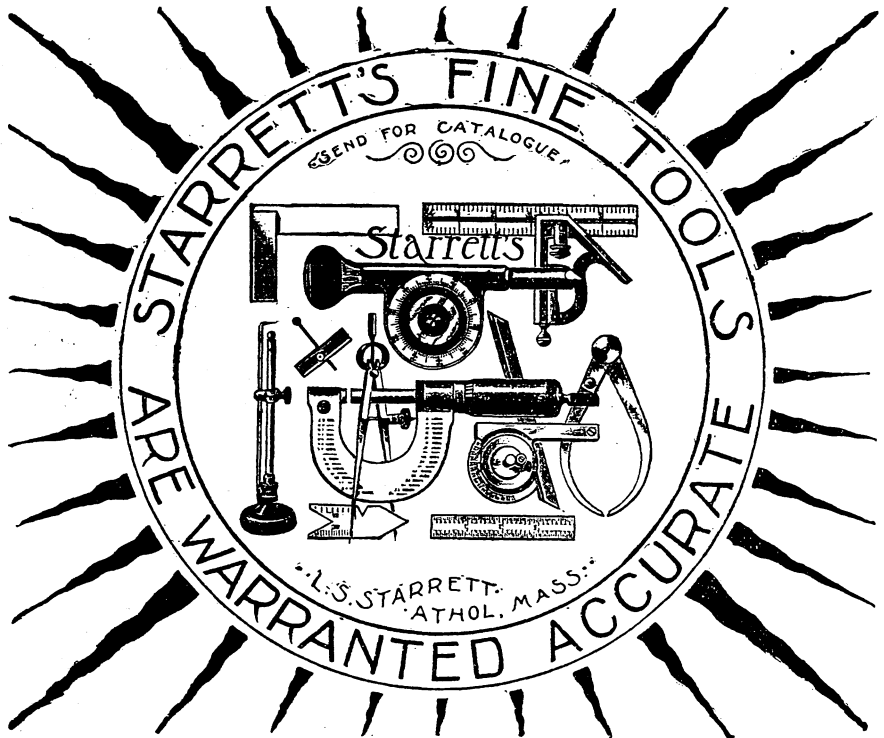
**IRON INSTEAD OF WOOD.**  
**GALVANIZED IRON TUBING and CURB,**  
 — FOR —  
**CHAIN PUMPS,**  
 (Kegler's Patent)  
 Are Giving Universal Satisfaction,  
**BECAUSE:**



They do not rust and accumulate filth—always clean. Extreme lightness is combined with strength and durability. No freezing. No waste of water by reason of enlarged reservoir at top of tubing. No annoying wheel at bottom. Easy to handle.

Tubing weighs less than  $\frac{1}{4}$  lb. per ft., is connected by couplings and can be attached to any make of curb.

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 L. S. STARRETT, ATHOL, MASS.  
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**HOLLANDS' OFFSET JAW VISE.**

Specially adapted for drill press work where chucks cannot be used and equally good for special or regular bench work.

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Has a Universal Chuck with Tool Steel Jaws, and will hold Round Shank Twist Drills from  $\frac{1}{8}$  inch, to  $\frac{1}{2}$  inch, inclusive. It is supplied with a **patented locking device** for securing the gears (*SEE CUT*)—enabling the operator to use all the power necessary on the Chuck Sleeve, without the annoyance of trying to hold the gears from turning; a feat never before accomplished without the aid of a nail, file tang, or some instrument placed between the gear and pinion to act as a stop.

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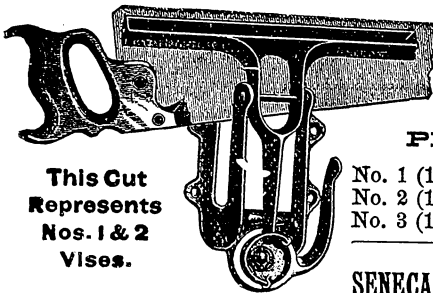
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## WENTWORTH'S PATENT NOISELESS SAW VISES, WITH RUBBER CUSHIONED JAWS.



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**STEEL STAMPS**  
For Every Purpose.  
Steel Letters and Figures.  
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NICKLE, Silver and Bronze Metallic  
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Pattern Letters, Steel Stamps, Brands  
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We make a specialty of the Hardware Trade.  
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4-6 and 8 inch.



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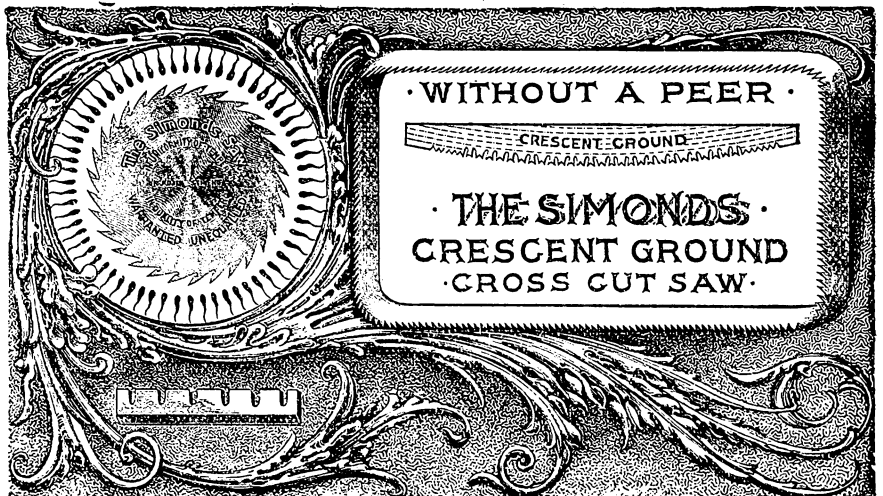
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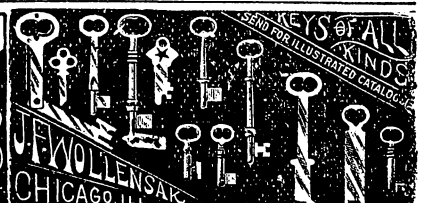
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Mechanics are now inquiring for this tool, and Hardware Dealers should have them in stock, or at least have a sample.

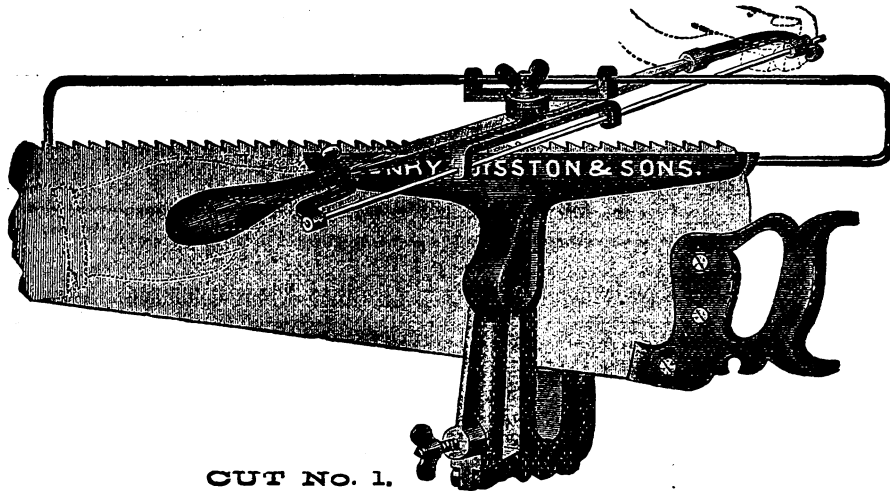
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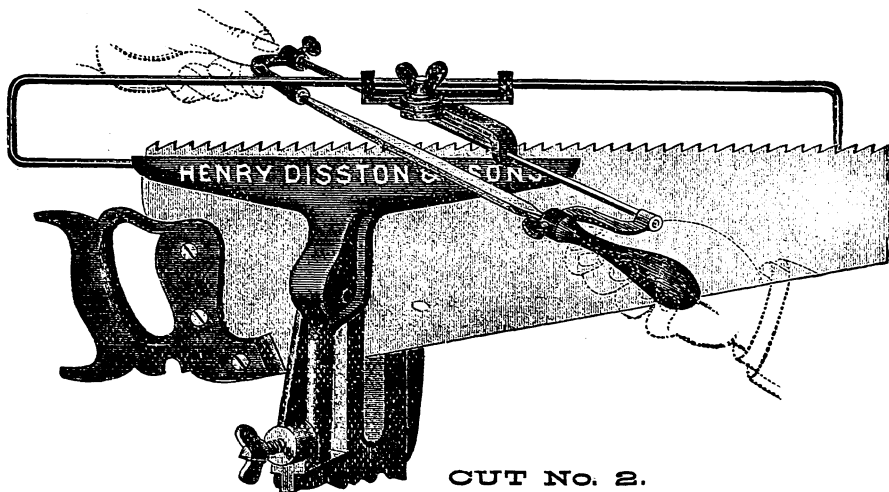
# DISSTON'S Improved Saw Clamp AND FILING GUIDE.

ESPECIALLY DESIGNED TO ASSIST THOSE NOT SKILLED IN THE ART  
OF SAW FILING TO FILE A SAW CORRECTLY.



CUT No. 1.

Cut No. 1 shows a saw and the attachment in proper position for filing the first side; and Cut No. 2 shows the saw and attachment reversed and in position to file the second side. There are three marks on one of the hubs of the swivel attachment, and one mark on the other. One of the three marks shows when it is in position No. 1, and the other designates when it is in position as shown in No. 2. The third, or centre, marks show when it is in position for filing Rip Saws.



CUT No. 2.

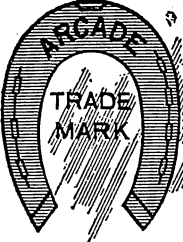
To obtain the correct position, loosen the wing nut and move the guide around to the point desired; after tightening wing nut, loosen screw in file handle, then turn handle until file gives the shape tooth wanted.

A good way is to select a tooth of correct shape and let file down into it, tighten set screw in handle, then file a tooth to see if the shape suits. If not turn the file a little to the right or left and try another tooth until the proper shape is obtained. Then file every other tooth, see cut No. 1; when one side is filed, reverse saw and attachment and adjust as in No. 2, and file the other teeth. For Rip Saws, place the file at right angles with the saw and file every tooth. Always keep the file as nearly horizontal as possible.

This filing guide is sold only attached to our No. 3 Improved Clamp or Vise, and not sold separately. We recommend this as the best saw clamp on the market, being quickly and easily adjusted, and not liable to get out of order.


Write for price including No. 3 Clamp, Filing Guide, File and Handle complete. Packed one in a wooden box.

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**TOOLS for**

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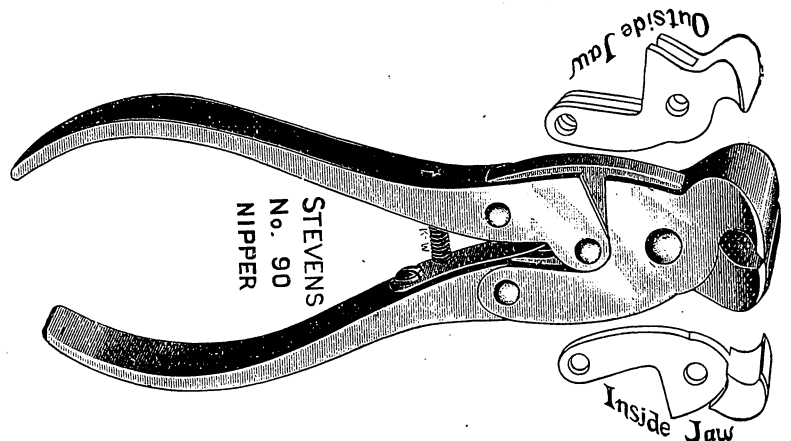
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**J. Stevens Arms & Tool Co.,**

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CHICOPEE FALLS, - - MASS.

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Wire can be cut at either extreme end of Jaws without the opposite end closing faster than the cutting end, as is the case with all other compound nippers. Will cut Music Wire.

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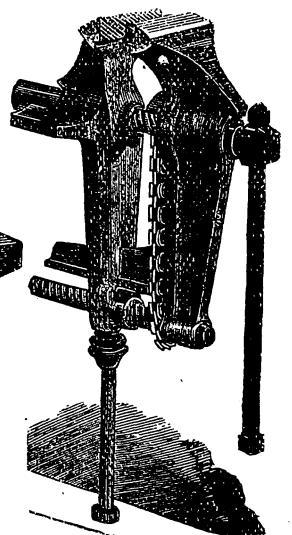
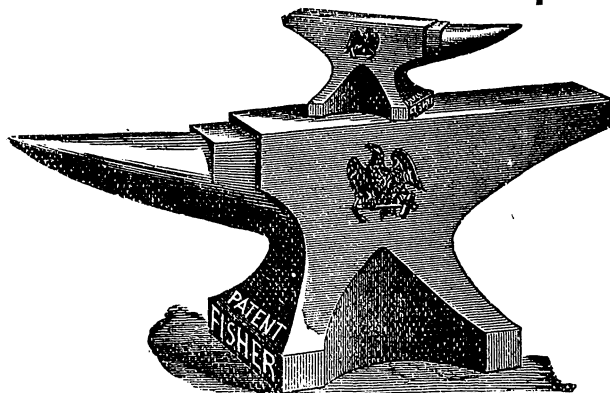
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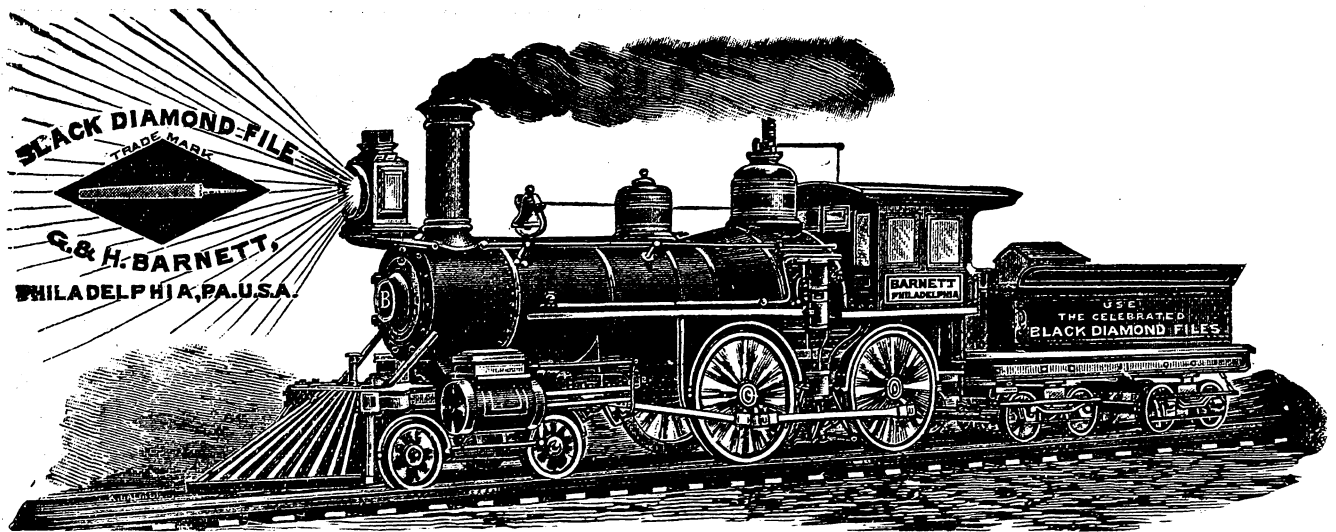


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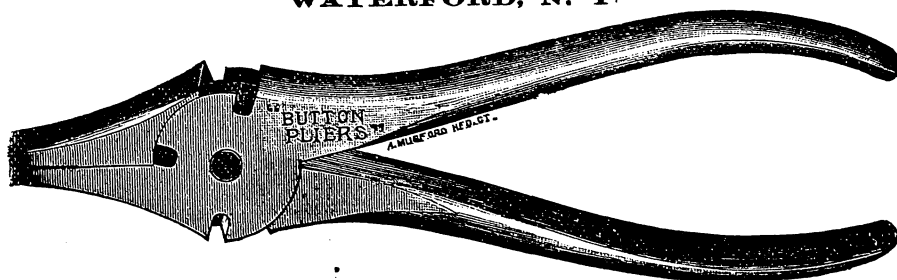
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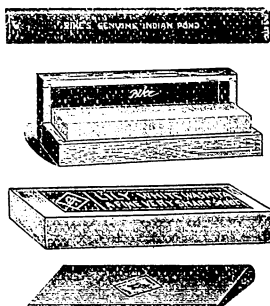
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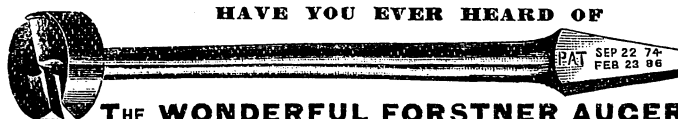
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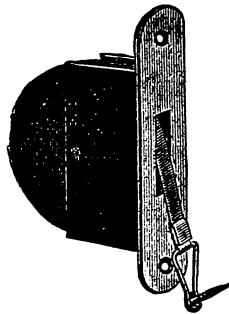
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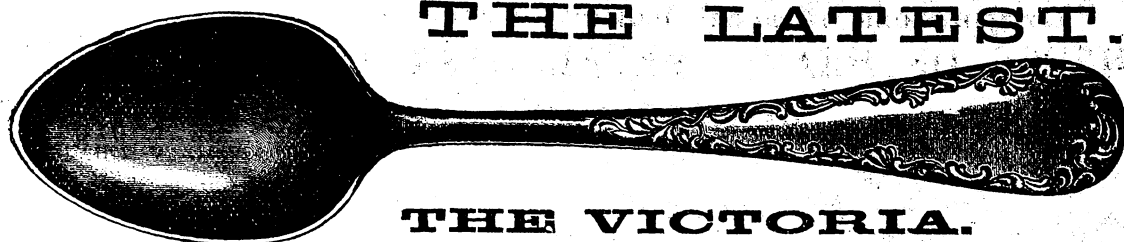
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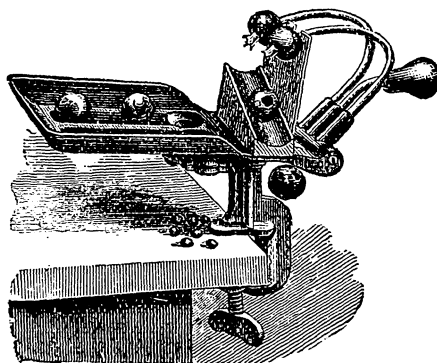
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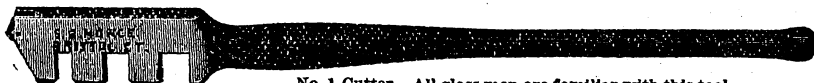
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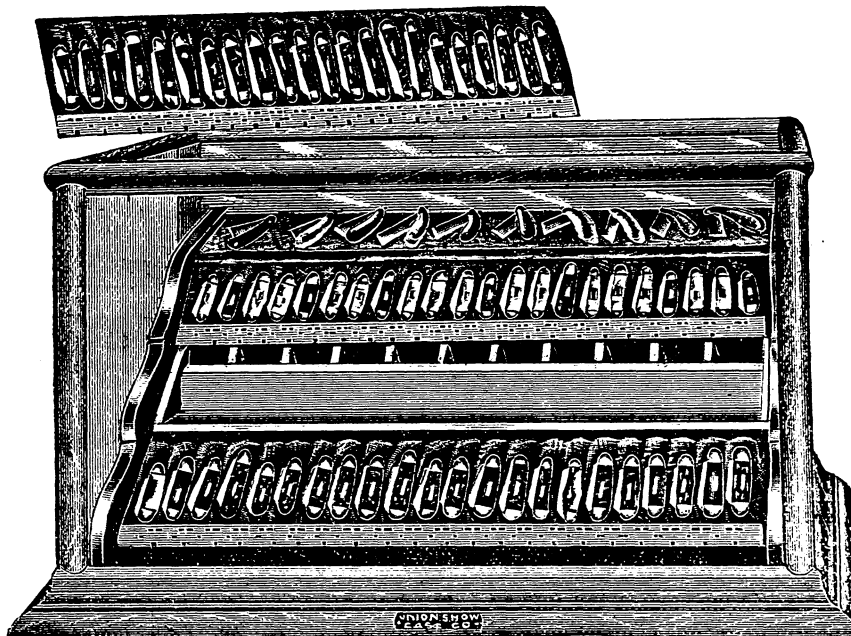


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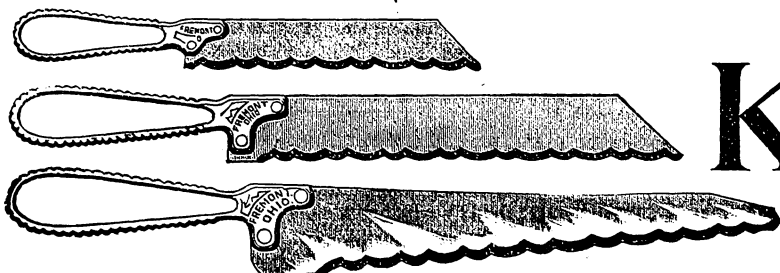
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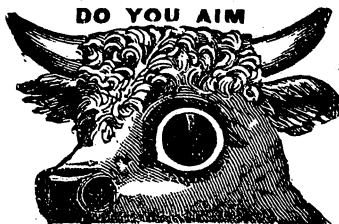


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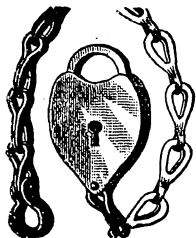


## To Make a Bull's Eye In Your Business or at the Range?

If you deal in ARMS or AMMUNITION or shoot a Rifle, Pistol or Shot Gun, you will make a **HIT** by sending for the **IDEAL HAND BOOK**.

**IDEAL MFG. CO., New Haven, Ct., U. S. A**

Please mention *The Iron Age* when you write.

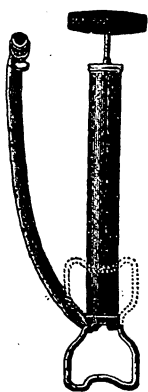


## Bicycle Locks. Bicycle Bells.

Especially Low Prices.

We manufacture hardware specialties of all descriptions to order.

**HAINES & ZIMMERMANN, 407 Cherry St., Phila.**



## HEATH'S BALL VALVE PUMP AND UNIVERSAL COUPLING, For Bicycle and Sulky Wheels.

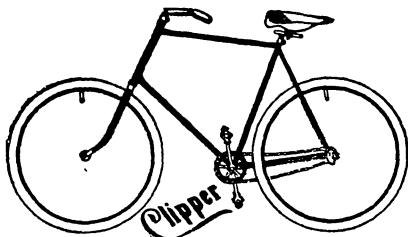
The handiest, windiest, strongest pump in the world at any price.

Price \$2.00.

Liberal discount to the trade.

Manufactured by

**S. F. HEATH CYCLE CO.,  
Minneapolis, Minn.**



## Clipper Bicycles

are built to please the dealer and rider.

Are you in the bicycle business? If not, you can make it pay to handle Clippers. Buy direct from the manufacturer and save the jobbers' profit. It will add considerable to your bank account. We want responsible dealers only. We may be able to interest you, in fact we are sure of it. Our policy is a protective one, and will please you. It protects against Scalpers and "Curb Stone Brokers."

**Grand Rapids Cycle Co.,  
Grand Rapids, Mich.**

## Every Year

the "STERLING" becomes more popular with dealers. They find it gives better satisfaction than any other wheel. No worry over repairs.

## THE STERLING (Built like a Watch.)

A wonderful, strong, light wheel, with a dozen points of superiority over all others. Our "new departure" catalogue (free) tells all about it.

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234 Carroll Ave., CHICAGO.**

# THE BEST JUVENILE BICYCLES

At a Lower Price than Poor Machines can be Bought.

**FALCON JUNIOR** for boys. 24 in., weldless tube, all steel, 1½ in. Whippet pneumatic tire.

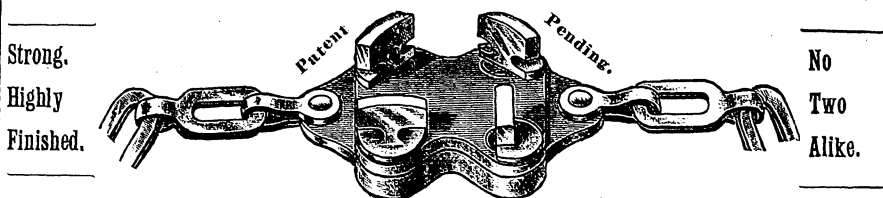
**FALCON JUNIOR COMBINATION** for boys and girls. 24 in., weldless tube, all steel, 1½ in. Morgan & Wright pneumatic tire.

We have closed out all our other styles and these are going. There is nothing like them at any price and no other price as low.

## THE W. BINGHAM COMPANY, CLEVELAND, OHIO.

## THE GOODHUE COMBINATION LOCK.

A KEYLESS LOCK FOR CYCLISTS, TRAVELING MEN, ETC.  
EASILY OPERATED IN THE DARK.



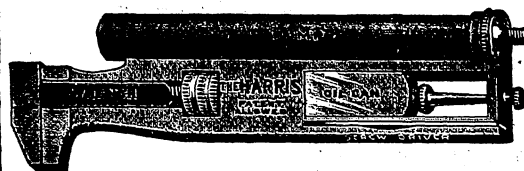
Strong.  
Highly  
Finished.

No  
Two  
Alike.

Special Design made for "Lockers."

List, \$1.00. Good Discount to Dealers. Manufactured and sold by  
**THE INDEPENDENT ELECTRIC CO., - - - 39th St. and Stewart Ave., Chicago.**  
**PARKHURST & WILKINSON, General Western Agents.**

## HARRIS COMBINATION WRENCH.



Wrench, Oil Can, Screw  
Driver and Pump all  
combined in one.

Made of drop forged steel, case  
hardened; weight, 10 ounces or 3  
ounces less than all the other tools  
separate.

Electrotypes on Application. Send for Descriptive Circular.

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## THE CRAWFORD MFG. CO.

MAKERS OF

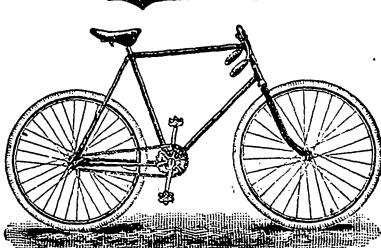
HIGH GRADE AND JUVENILE

## == BICYCLES, ==

FACTORY, HAGERSTOWN, MD.

NEW YORK OFFICE, 72 READE STREET. L. B. Whymper, Mgr.

## Remington Cycles.



In Design, Workmanship, Material and  
Finish they are BEST.  
SEND FOR CATALOGUE.

**Remington Arms Company  
313-315 Broadway, New York.**

## Phillips Screens

FOR DOORS AND WINDOWS, ARE WELL  
MADE, FROM GOOD MATERIALS BY

**A. J. Phillips & Co., Fenton, Mich.**

## Yacht AND Boat Hardware.

**L. W. FERDINAND & CO.,  
BOSTON, MASS.**

Send for 226-Page Catalogue.

## MENDING CONE

For mending Tin, Copper, Sheet  
Iron and Agateware without solder  
or acid. A child can use it. Best selling  
article invented. Big inducements to  
agents. One box will mend 125 holes.  
Sample box by mail 25 cents.  
Address, P. D. MURPHY, LOCKPORT, N. Y.



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IMPORTERS, MANUFACTURERS' AGENTS AND JOBBERS OF FINE FISHING TACKLE.

## OUR LEADING SPECIALTIES ARE:

Skinner's Celebrated Fluted Trolling Spoons.

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Bray Fly Books.

"Neverbreak" Split Bamboo Rods.

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Littlefield's Collapsing Net Ring and Staff,

The Latest and Best Ring on the Market.

SEND FOR OUR NEW CATALOGUE.

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Worcester,



Mass., U. S. A.

The most extensive Skate Factory in the World.

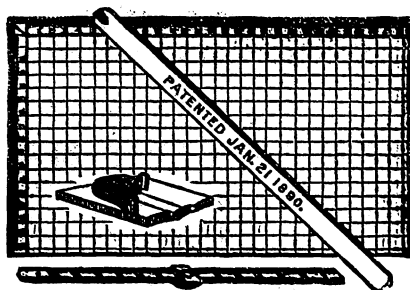
# BAG THE SPORTING TRADE IN YOUR TOWN BY HANDLING THE PARKER GUN.



Reliable, Accurate,  
Handsome.

Send for Catalogue and Prices.

**PARKER BROS., - 48 ELM ST., MERIDEN, CONN.**



## The Canton Glass Board.

Cuts any Fraction of an inch by Eighths.

Unequaled for accuracy and quick work in cutting square or at any angle. Saves breakages, &c.

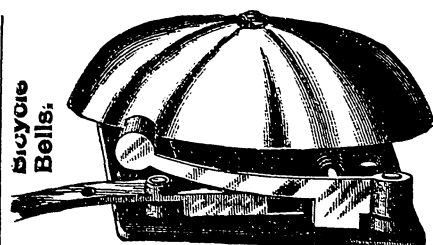
ALSO —

IMPROVED TRAMMEL RULE for Cutting Circles

From 3 inches up to 48 inches, Segments, Gothic Shapes, &c.

Send for Circular.

The Canton Saw Co., Canton, Ohio.

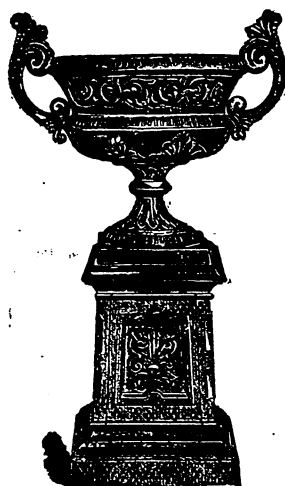


Bicycle Bells.

BEVIN BROS. MFG. CO., Easthampton, Conn.

Manufacturers of Sleigh Bells, House, Tea, Hand, Gong Bells, &c.

## IRON RESERVOIR VASES.



Nearly 100  
styles and  
sizes.

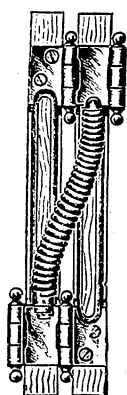
List prices  
from \$6.00  
to \$100.00  
each.

These Vases  
are made with a  
reservoir for  
water, from  
which a con-  
stant and even  
supply of moist-  
ure is drawn by  
capillary at-  
traction, and  
they do not need  
watering often-  
er than once in  
ten or fifteen  
days. Thou-  
sands of Reser-  
voir Vases are in

use on lawns and in cemeteries all over the  
country. Our prices are no higher than those  
of ordinary vases.

Catalogue sent on application.

**WALBRIDGE & CO.,**  
BUFFALO, N. Y.



Highest Award, World's  
Columbian Exposition,

— ON —

## SPRING BUTTS.

For Catalogue and Prices Address

**CHICAGO SPRING BUTT CO.**  
CHICAGO, ILL.,

Or 97 Chambers Street, N. Y.

## ACME CUTTING TOOLS

Made in all Sizes.



SOLID STEEL ACME PLIER  
AND WIRE CUTTER.  
Made with cutters of best steel.

strong as solid steel.



ACME CUTTING NIPPER.  
Jaws of choicest Tool Steel, dove-  
tailed into the head, making it as

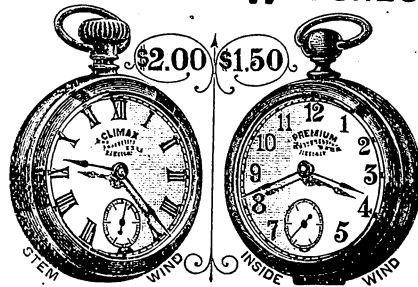
**HIGGANUM HARDWARE CO., HIGGANUM, CONN.**  
New York Office, 18 CHAMBERS STREET.

## Don't make Mistakes.

*It will pay you to use this book.*  
*W.J. Ladd*

**TO**  
**SAVE** time,  
**A**void error,  
**V**erify computations,  
**E**scape annoyance,  
And to be correct, honest and happy, **USE**  
**LADD'S DISCOUNT BOOK.**  
It costs only three dollars, or four dollars for the Double Indexed Edition, and will be sent, postpaid, to any address, upon receipt of price.  
**DAVID WILLIAMS,**  
96-102 Reade St., New York.

## AMERICAN WATCHES.



During 1894 the sales on these watches amounted to 600,000, the larger portion through hardware dealers. We furnish them in Nickel and Gilt, Fancy and Plain Cases, Roman or Arabic Dials. Sample Stem Wind \$2.00, post-paid, \$15.60 doz., including a chain with each watch. Sample Inside Wind \$1.50, post-paid, \$12.60 doz., also including a chain with each.

**R. H. INGERSOLL & BRO.,** Sole Mfrs.,  
65 Cortlandt St., New York.

## Phillips Screens

FOR DOORS AND WINDOWS, ARE WELL  
MADE, FROM GOOD MATERIALS BY

**A. J. Phillips & Co., Fenton, Mich.**

## American Stamping Co.,

Manufacturers of

All Kinds of Tinware and Sheet  
Metal Goods.

N. Y. Office and Salesroom, 104 & 106 John St.  
Factory, 103 to 119 N. 3d St., Brooklyn, E. D., N. Y.

For Sale by  
the  
Hardware Trade.

The Enterprise Mfg. Co. of Pa.,

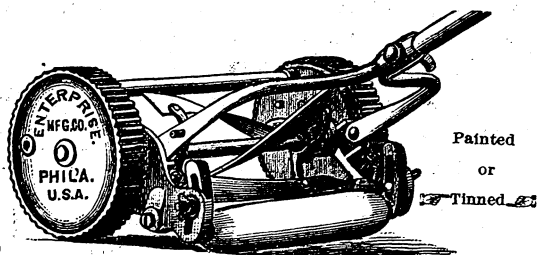
THIRD and DAUPHIN STS., PHILADELPHIA, PA.

Send for  
Catalogue.  
Free.

## ENTERPRISE LAWN MOWERS,

7, 9, 11, 13, 15 INCHES.

3  
or  
5  
Blades.

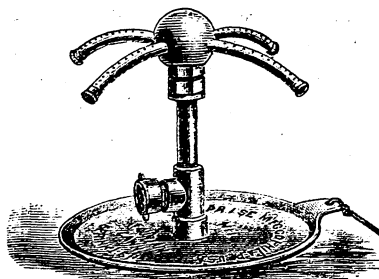


Painted  
or  
Tinned.

Equal to the best in the market.  
Prices quoted on application.

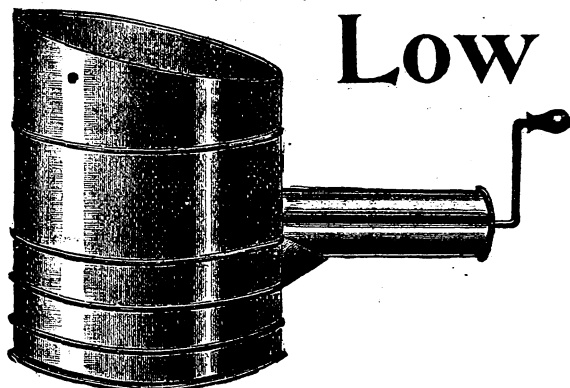
## ENTERPRISE Lawn Sprinklers.

Finished  
in a  
Superior  
Manner.



Muddy  
Water  
does not  
Interfere  
with it.

No well kept Lawn complete  
without one.



## Low Prices.

WRITE TO KNOW THE  
RECENT CHANGES.

OUR FOUR STYLES OF SIFTERS  
ARE GUARANTEED TO BE ALL

## High Quality.

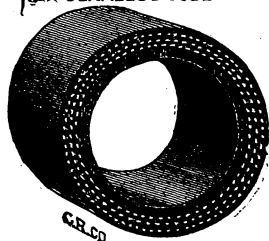
Dealers everywhere are entitled to New Catalogue  
and New Prices.

**Bromwell Brush & Wire Goods Co.,**

Established Seventy-six years.

Cincinnati, O.

NEW SEAMLESS TUBE



## Who Has Not Had Bad Hose ?

Who has not lost time, patience, money, by attempting settlement for such goods ?

THE CAUSE in nine cases out of ten is the lapped seam.  
THE REMEDY is in buying our

### PATENT SEAMLESS TUBE HOSE,

made by machinery, the tube run like lead pipe, through a die. There is no lapped tube, no seam, no cracks, no defects; water cannot get through to rot the duck and cause the hose to burst.

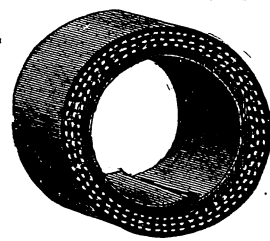
Made in All Sizes and Kinds of Garden, Engine, Steam, Fire, Brewers', Cotton Hose, &c.  
Order a Sample Bale of our Seamless-Tube Hose—Best in the World, costs no more than ordinary lapped-seam hose. The different colors, Red, White, Black, Green and Yellow, make a fine window or sidewalk attraction.

## CLEVELAND RUBBER WORKS

of the Mechanical Rubber Co.,  
CLEVELAND, O.

Makers of Mechanical Rubber Goods, Clothing, Druggists' Sundries, Specialties, Etc.

'OLD LAPPED TUBE



We were awarded an order of  
25,000 ft. for World's Fair  
of our celebrated  
**Seamless-Tube**  
COTTON RUBBER-LINED HOSE

We Want Your Trade.  
Send for 60-page Catalogue.  
Write for Prices and Samples.

SALES OF  
Over Two Million Feet

—OF—  
**GARDEN HOSE**  
alone during the past year,  
distributed throughout  
the United States, and not a  
single piece complained of,  
justifies us in guaran-  
teeing that it will give absolute  
satisfaction.

## Hudson's Garden Hose Mender

So Simple a Child Can Use It.

Made in three sizes, for 1/2 in., 3/4 in. and 1 in. hose.

Put up in Boxes for Family use.

EACH BOX CONTAINS:

- 1 Pair Pliers,
- 20 Bands,
- 6 Tubes.

Sells readily at 75 cents.  
Liberal discount to Dealers.  
Send for Full Description.

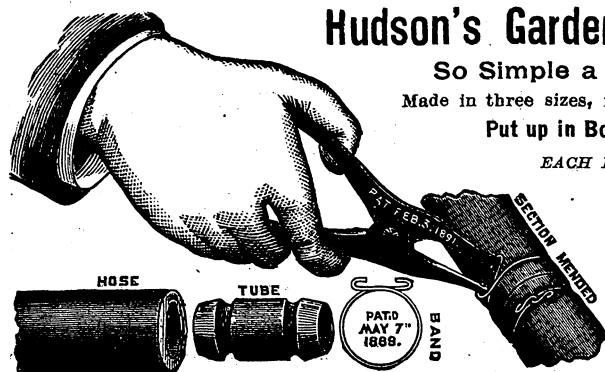
WRITE TO

**The Bourke Manufacturing Co.,**

YOUNGSTOWN, OHIO,

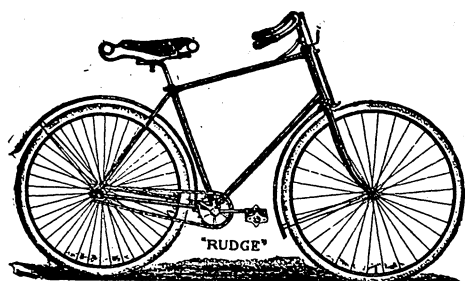
For catalogue and discounts on

Ventilating Sash Lock and Fastener,  
Diagonal Sash Lock and Fastener,  
Extension Handle Couplings,  
Galvanized Iron Window Cleaners,  
Floor Scrubbers and Dryers,  
Excelsior Bar Cleaners,  
Combination Brush, Mop and Sponge Holder.



**C. E. HUDSON & CO.,** Manufacturers, **Leominster, Mass.**

H



## HARDWARE DEALERS AND RUDGE CYCLES.

Agents wanted immediately for unoccupied territory. Write for illustrated catalogue and Price-list of 1894 Wheels.

# The Bronson Supply Co.,

Sole Agents for the United States.

72 Beekman St., New York.

### COMMON MOUSE TRAPS BEST FOR USE!

Ripley Mfg. Co., Unionville, Conn.



Porcelain-Lined Lemon Squeezers, Steak Hammers, Boot Jacks, Magnetic Tack Hammers, Mallets, Bung-Starts, Hand Screws, Beacon Hill Pat. Mouse Traps, Sunny-Side 2 lb. Lap Board

### HARDWARE SHELF BOXES

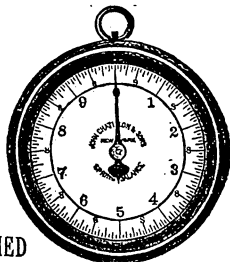
Made of Wood.  
No screws or nails used to work out and cut your shelving.

Look the matter up. Descriptive circular with list of references and prices mailed on request. We also make Wire Stitched Folding Paper Boxes and all other kinds of Paper Boxes. Write us.

JESSE JONES & CO., 615 and 617 Commerce St., Philadelphia.

## John Chatillon & Sons,

85, 87, 89, 91, 93 CLIFF ST., NEW YORK.



ESTABLISHED

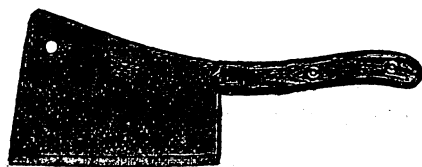
1835.

SEND FOR  
PRICE-LIST.

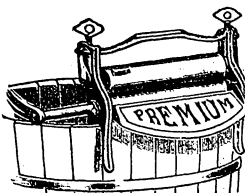


Sole Agents for

Foster Bros.' Butchers' Cutlery.



John Chatillon & Sons, N. Y.



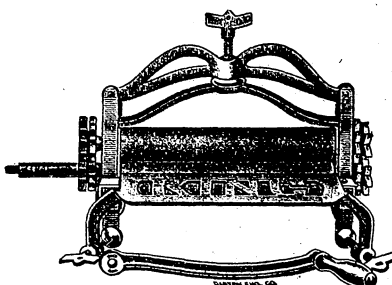
COLBY WRINGER CO., - Montpelier, Vt

MANUFACTURERS OF THE

### Premium Wringer,

With Automatic Apron Adjustment.

SURPLESS, DUNN & ALDER, Direct Representatives,  
15 Murray Street, New York.



We are Sole Manufacturers of the  
Celebrated Erie and King Wringers.

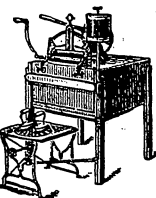
We also make all other brands of Wood and Iron  
Frame Wringers.

Exclusive sale of the **ERIE** and **KING** Wringers  
given to one dealer in each town.

Write for Catalogue.

THE NATIONAL WRINGER CO., CANTON,  
OHIO.

New York Office, 107 Chambers St., John T. Ryan, Mgr.



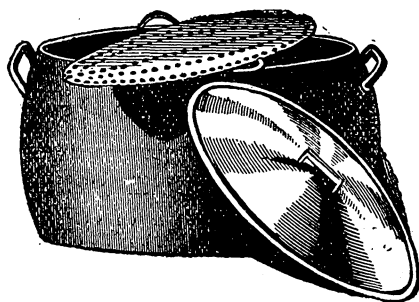
## WASHING DAY.

The saddest of all the year,  
It brings no rest, it brings no cheer.

But the "Columbian" (Self-Heating) Washer and Stove Combined makes "Washing Day" as good as the others of the week. Does away with all lifting, and being around a hot stove. Washes and boils the clothes at the same time. A wonderful seller.

SEND FOR A SAMPLE.

BENBOW MFG. CO., - St. Louis, Mo.



## SEASONABLE NEW SEASONABLE

The S. & P.

### ASPARAGUS AND CORN COOKER,

For Corn, Asparagus, Meats, Etc., Etc.

Blue Enamel Finish Outside. Tinned  
or Enameled Inside. Strainer for  
Lifting Out. Side Handles.

Three Sizes: No. 1, \$1.40; No. 2, \$1.60;  
No. 3, \$2.00 each.

TRADE DISCOUNT, 50 PER CENT.

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THE STUART & PETERSON CO., - Burlington, N. J., U. S. A.  
SPECIAL GOODS TO ORDER.

### THE SCHULTZE LOCK UNPICKABLE.



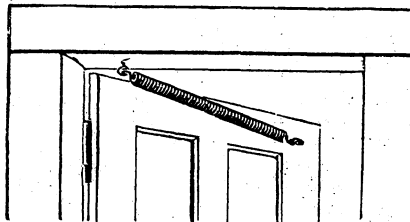
SEND FOR CIRCULAR.

MANUFACTURED ONLY BY

The Schultze Mfg. Co.

Cor. Emerald & Wishart Sts., Phila., Pa.

### THE PERFECT DOOR SPRING.



Cheap, Simple, Durable, Effective.

Best Screen Door Spring made. Send for our list of  
references, comprising some of the first houses in the  
land. They sell readily, and that is what you are  
looking for. Drop us a postal.

COILED WIRE BELTING CO.,

40 & 42 Noble St., Jersey City.

Practical Hints on Joint Wiping, For Begin-  
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print from *The Metal Worker* of two articles on  
the method of Joint Wiping, an operation calling  
for a very large degree of manual skill. It is  
illustrated from photographs representing the  
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positions, and gives all the assistance that descrip-  
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illustrations, 48 pages, paper, .....\$0.25

For sale by David Williams, 98-102 Reade St., N. Y.

# NEW DEPARTURE "ROTARY" DOOR BELLS

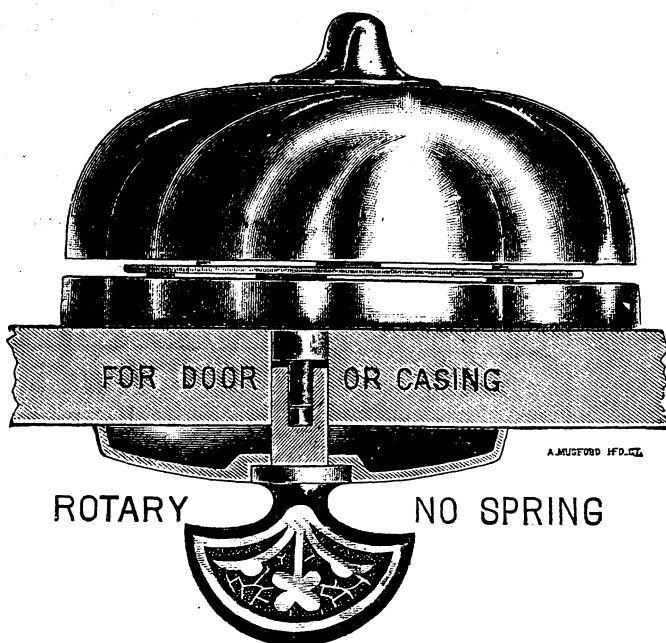
## ELECTRICAL RESULTS.

3 Inch.

No. 91, Nickel Plated.

No. 92, Bronze Plated.

Per Doz., \$17.50.



3 1/2 Inch.

No. 101, Nickel Plated.

No. 102, Bronze Plated.

Per Doz., \$20.00.

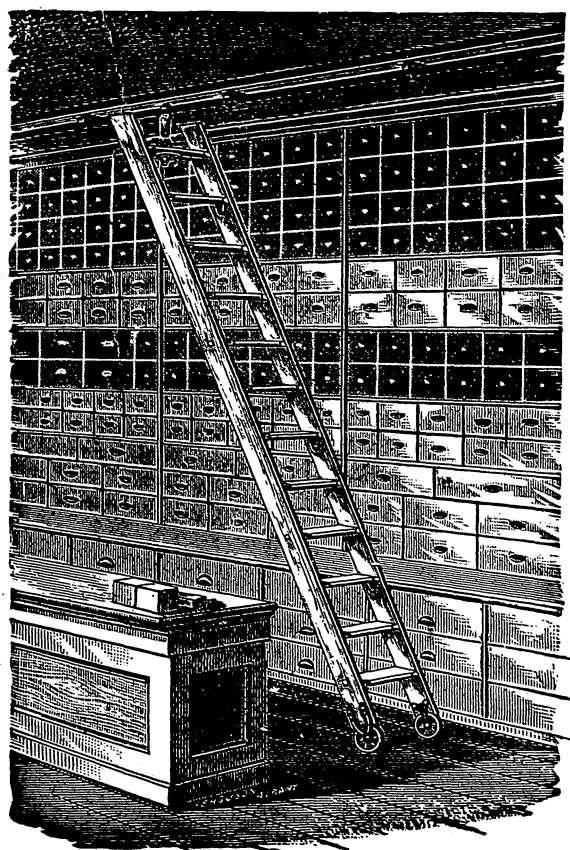
Simply turning the knob about **one-fourth** in either direction produces about **ten** clear, full tones, which though not startling or annoying, can be better heard all through the house than any bell ever made to imitate Electrical Results.

SOLE AGENTS,

**JOHN H. GRAHAM & CO.,** { 113 Chambers St.,  
N. Y. CITY, N. Y.

WRITE FOR PRICES.

## THE "NOISELESS" STORE LADDER.



The latest and best. Perfectly noiseless. Neat in appearance.

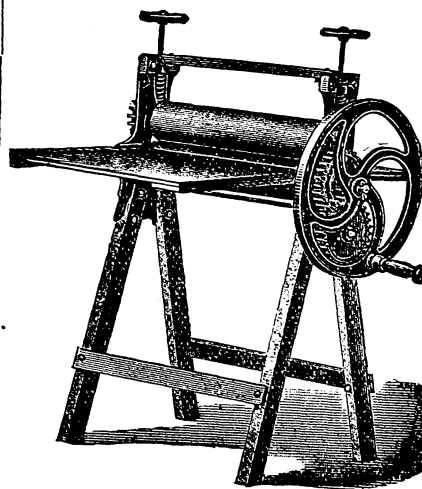
Manufactured by  
**M. CROISSANT,**  
ALBANY, N. Y.

## The Family Mangle.

WARRANTED TO DO  
Better Work than Hand-Work.

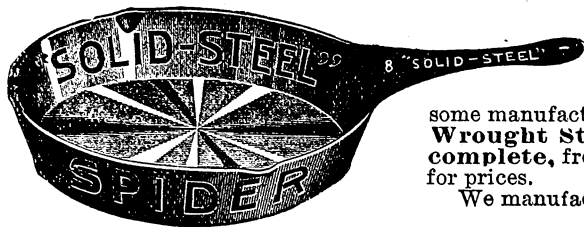
**SAVES** all the fuel,  
two-thirds the work.  
Keeps the linen whiter.

We Guarantee Every Machine.



Send for descriptive circular to  
**S. C. Johnson, Racine, Wis.**  
Agents Wanted.



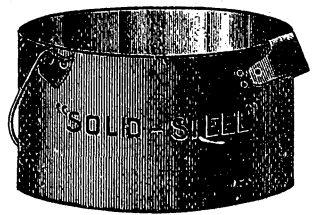
**"SOLID-STEEL" SEAMLESS HOLLOW WARE.**

No Seams, no Rivets in "Solid-Steel" Ware.

**Brilliant Finish.**

Notwithstanding the claims made by some manufacturers' agents our spiders are made from **Wrought Steel, Without Seams or Rivets, complete, from a single piece of metal.** Write for prices.

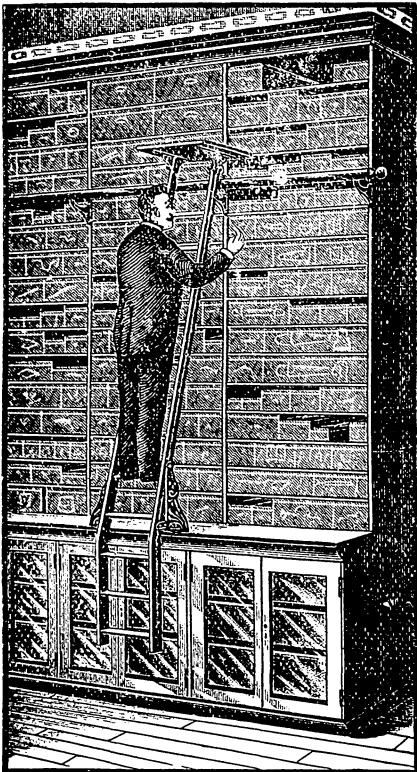
We manufacture our own goods.



"Solid-Steel" Maslin Kettle.

**The Cleveland Stamping & Tool Co., Cleveland, O.**

**We do Light and Heavy Stamping and Blanking. Also build Dies and Stamping Machinery.**

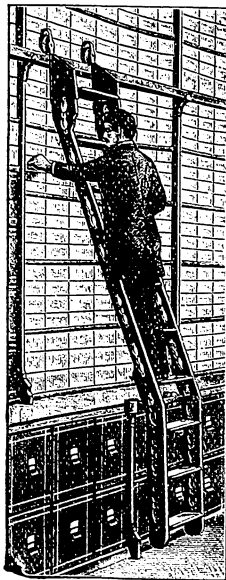
**THE BICYCLE STEP LADDER.**

Highest Award, Columbian Exposition.  
The Newest, Neatest, Simplest, Easiest Operated and Safest Store Ladder made.  
Ladders are not Suspended, but Supported from below on wheels. Move easier with operator on than others when empty. Highly finished, and very hand some. Made in different grades and prices to suit. Send for illustrated catalogue and prices. See this space next week for other styles.

The Bicycle Step Ladder Co., 50 State Street, Chicago, Ills.

**An Investment**

- ✱ That soon pays for itself, and a fixture you will wonder
- ✱ how you have got along without. Hundreds of recommendations to this effect. This is without doubt the best device of the kind on the market to-day. Steel rail planed to get the smoothest surface. Brackets made to fasten to standards, pilasters, or shelving direct. Can be adjusted to shelving with wide or narrow ledge, and can also be fitted where there is no ledge and can be used on circular rail as well.



**WORLD'S FAIR AWARD.**

A postal card will get our Catalogue.

**Morley Brothers,**

123 N. Washington Ave., Saginaw, Mich.

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—BY THE—

**"New Process" (Evaporating) Stove**

**LIGHTS LIKE GAS.**

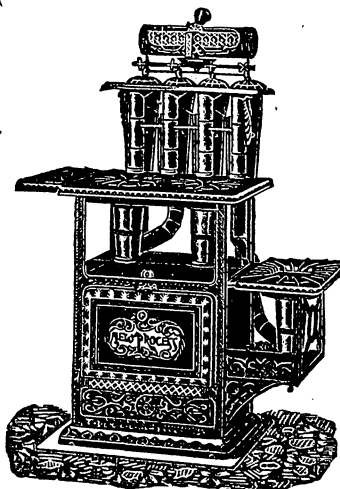
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More than a quarter million in use in the United States.

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Bakes Better and Costs less than any Coal or Wood Range.

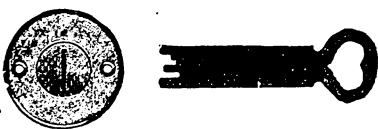
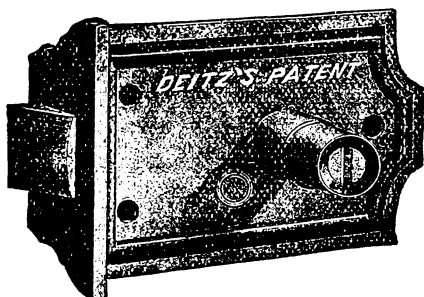
Saves both Time and Money. No Soot, no Dirt, no Ashes.



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**THE STANDARD LIGHTING CO.,**

600-620 Perkins Avenue, Cleveland, Ohio.

**A. E. DEITZ**

No. 109 Latch.

**J. C. McCARTY & CO., Agents,**  
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Factory, **BROOKLYN, E. D., N. Y.**

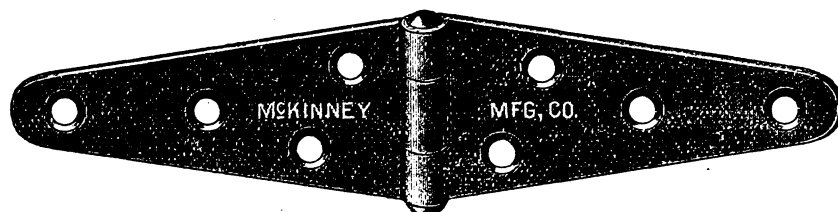


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STANDARD GOODS.

McKINNEY MFG. CO.. - ALLEGHENY, PENN.

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ORDERS FILLED  
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**"NONE BETTER."**

## BARN, MILL AND FIRE DOOR HANGERS HIGHEST AWARD

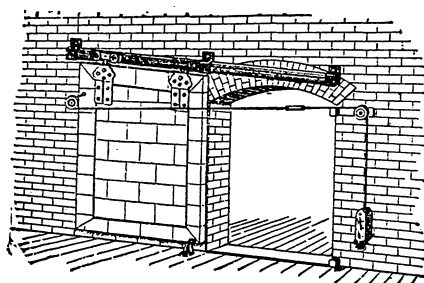
at WORLD'S FAIR, 1893,

— ON —

Parlor, Barn and Fire Door  
Hangers.

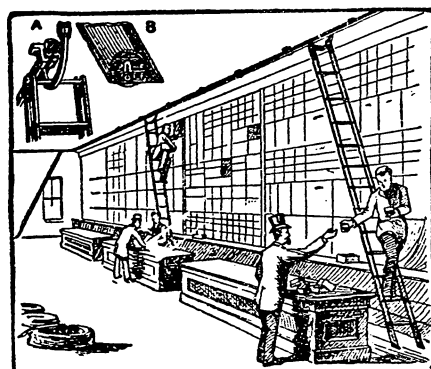
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COBURN TROLLEY TRACK MFG. CO.  
HOLYOKE, MASS.

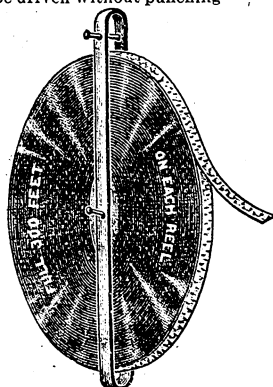


Fire Door Hangers. Best in the World. Equipped with Automatic Fire Door Fittings.

We make four styles of ROLLING LADDERS to reach shelving of any height.



A thin Metal Strap, through which a nail can be driven without punching



Put up in 300 feet Reels and Bundles of 100 pairs each, from 4 to 12.

## TO USERS OF BOX STRAPS:

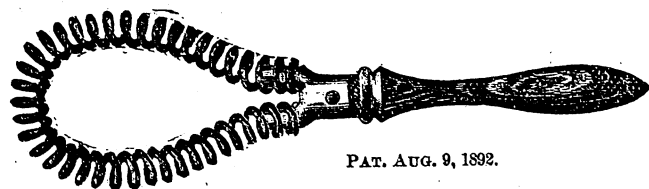
Certain competitors of ours have issued circulars pretending to have secured injunctions against us on our Self-Drawing Wire Strap (as shown in cut above), and on Steel Straps on Reels (see cut of Reel herewith). Such statements are absolutely false.

We have not been enjoined, either on our well-known Reels, or on the Self Drawing Wire Strap, on which we own the only patent in existence. On the Reel, these parties asked injunction and were refused by the Court. On the Strap, we sued them for infringing our patent: they at once changed their goods by stamping out the stock, making them weak and valueless. We therefore dropped the suit, and formal order of dismissal was entered. This is all the basis there is for the talk of "final judgment on April 2d." Our customers may depend on absolute protection on our goods as above. Very respectfully,

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PAT. AUG. 9, 1892.

NEAT, DURABLE, AND DOES THE BUSINESS.

For removing dust and filth from Clothing, Upholstered Furniture, Rugs and Carpets it is just the thing. Will raise the nap and so improve the appearance. Will not, like other Dust Beaters, leave marks, nor tear the fabric. The coil is of steel wire secured in a malleable iron socket and attached to an enameled wooden handle. Just what everybody wants.

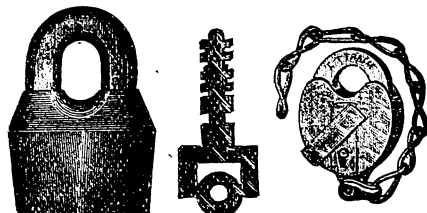
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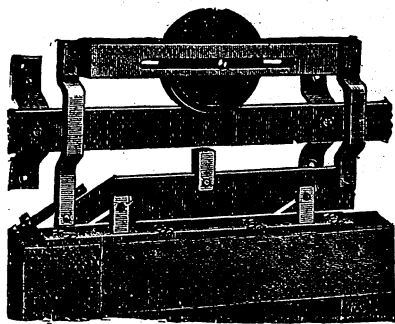
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## LANE'S PATENT NOISELESS STEEL PARLOR DOOR HANGER.

This Hanger is made of Steel.  
The Wheel is also Steel, except the filling or tread.  
The Track is of Steel—a single one only.  
The Hanger is Anti-Friction.  
More nearly Noiseless than any other.  
Ease of adjustment.

Can be erected with half the labor others require.  
Track will not swell, shrink or warp out of true.  
No cutting of doors.  
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Simplicity in all its parts.  
Durability.

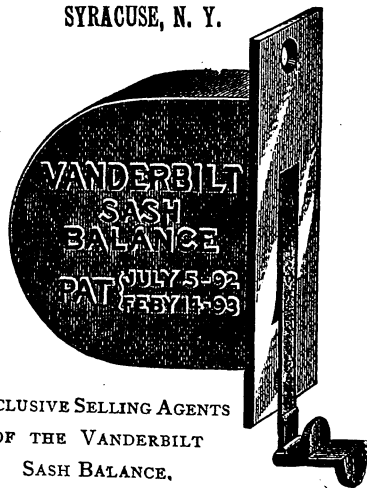
ALSO LANE BARN DOOR HANGER AND TRACK. SEND FOR CIRCULARS.

Manufactured by

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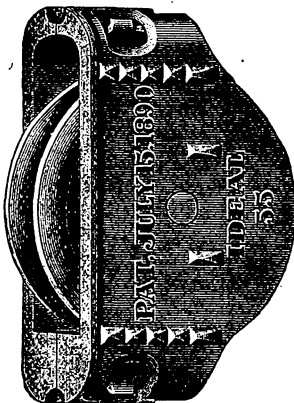
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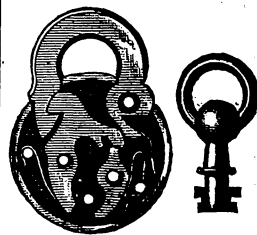


Adapted for auger socket or machine made mortise.  
Applied without chisel or screws, quickly and a perfect fit in every case. The only all round Sash Pulley made. Sample free. Price on application.

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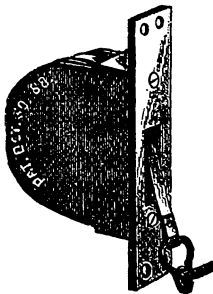


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Sizes,  $\frac{1}{4}$  inch to  $2\frac{1}{4}$  inches, of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also,  $\frac{1}{2}$  and  $\frac{3}{4}$  inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world.  
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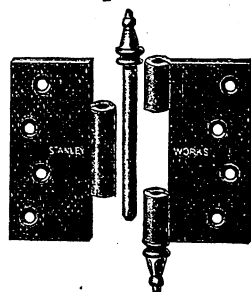
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ANY FINISH DESIRED.

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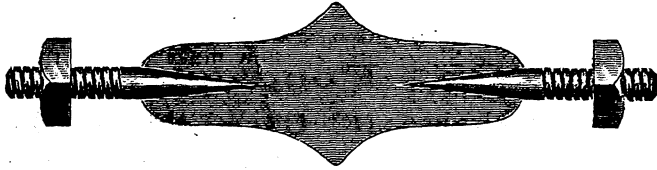
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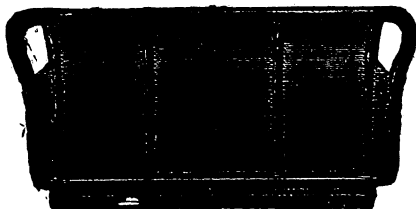
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**ARE BETTER IN EVERY WAY.**No waste material. Every ounce of weight in the line of  
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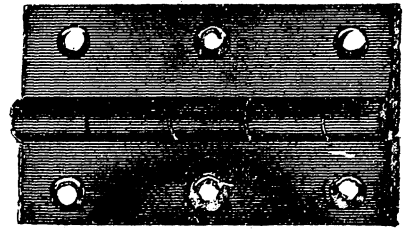
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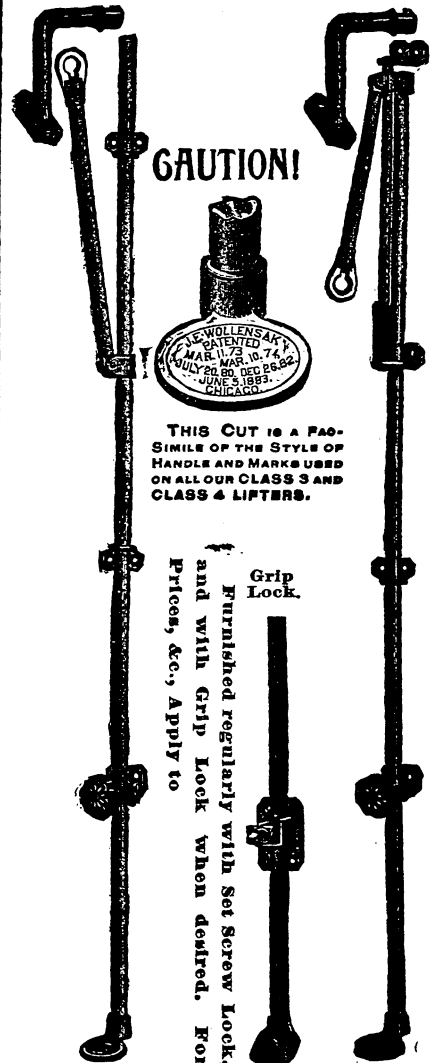
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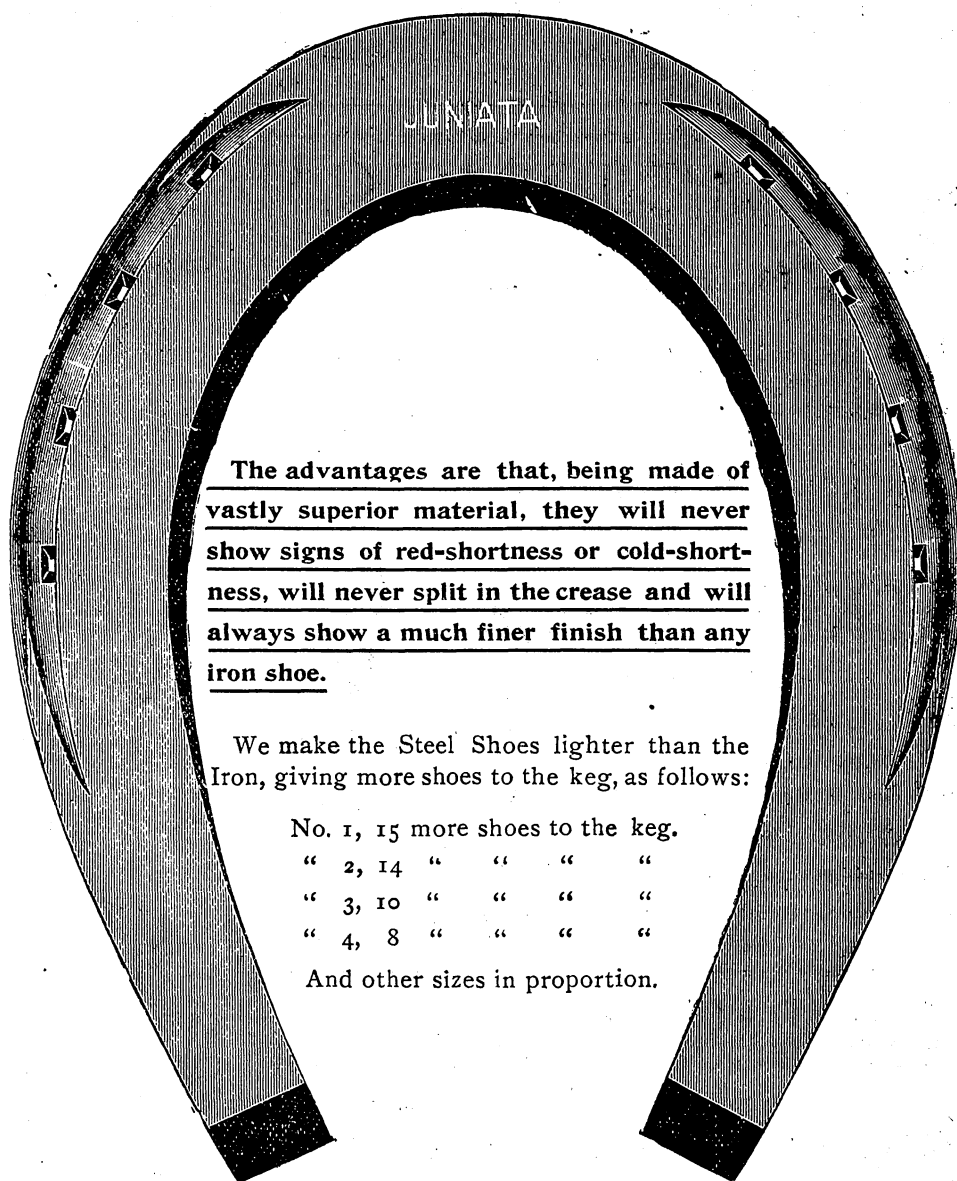
Estimates cheerfully given. Send for Catalogue

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SHOENBERGER & CO., PITTSBURGH, PA.,

After numerous and costly experiments have succeeded in manufacturing a special quality of soft homogeneous steel, specially adapted to the manufacture of Horse and Mule Shoes, and are now making from this steel Extra Swaged, and Government Pattern Horse and Mule Shoes. They give the best of satisfaction everywhere and we furnish them to the trade at the same prices as the regular iron shoe sold by ourselves and our competitors. We are at present making our Roadster Pattern Horse Shoes out of Iron, but we will make them of Steel, also within a short time.



The advantages are that, being made of vastly superior material, they will never show signs of red-shortness or cold-shortness, will never split in the crease and will always show a much finer finish than any iron shoe.

We make the Steel Shoes lighter than the Iron, giving more shoes to the keg, as follows:

No. 1, 15 more shoes to the keg.

" 2, 14 " " " "

" 3, 10 " " " "

" 4, 8 " " " "

And other sizes in proportion.

No. 2 EXTRA SWAGED FRONT.

We also beg to say that we have introduced improved machinery into our new factory and have doubled our capacity, and are now prepared to furnish the best shoe, either iron or steel, ever offered to the trade.

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Write to us for information and prices, or apply to jobbers and dealers, who sell them everywhere.

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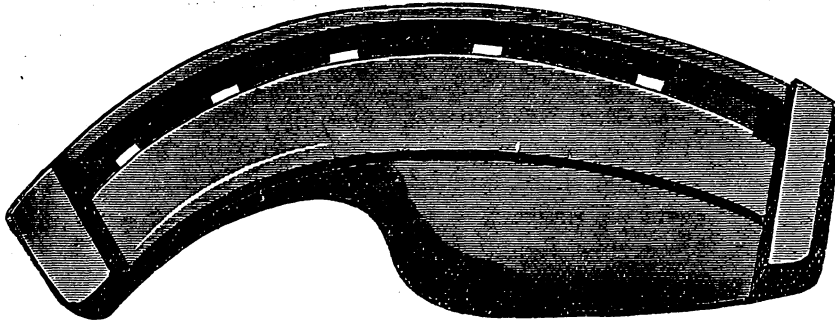
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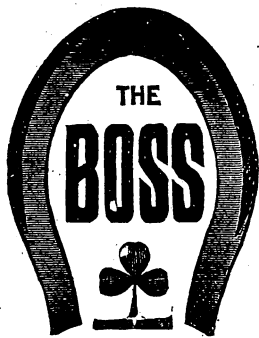
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SHOES.



Made under Deebie's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.



## HORSE AND MULE SHOES.

Superior Quality, Shape and Finish.

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JUST TRY THEM and YOU will say they excel all others.

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Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blank Nuts, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &c.

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Elegant Iron.

Beautiful Shape.

HORSE SHOES,

Light, Medium and Heavy.

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Illustrated booklet and prices to all parts of the world on application.

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"The Best Driving Nail."
 










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In the tests submitted before the judges on awards  
 the Capewell No. 6 was shown to be 17 per cent. tougher  
 than No. 8 of other makes.

**CAPEWELL HORSE NAILS,**  
 —MADE BY—  
**THE CAPEWELL HORSE NAIL CO., - - - HARTFORD, CONN.**

**Office of D. G. BURNHAM,**  
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October 28, 1893.

To THE CAPEWELL HORSE NAIL CO.:  
 Gentlemen—I have used your horse nails here on the horses belonging  
 to the World's Columbian Exposition, and I think they are far supe-  
 rior to any others that I have ever used. As I have been in the  
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Very respectfully,  
 HERMAN J. HENKE,  
 Foreman Blacksmith, World's Colum-  
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The Capewell Patent Corrugated Horse Nail.
 










Needs No Clinching.











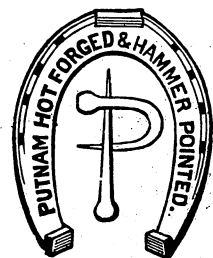

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FOR

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TO

## The PUTNAM Hot-Forged and Hammer-Pointed Horse NAILS,



At the *World's Columbian Exposition* at Chicago. A medal and diploma worded:  
*"Supreme excellence in material, method in manufacture, and quality of finished product; elasticity and smoothness combined with holding power in clinch. It allows the use of very small nails."*

There is nothing beyond "supreme excellence," nor is there anything comprised in a horse nail, except the "material from which it is made," "the method of manufacture," and "quality of finished product." Putnam nails, by their "elasticity," give slightly to the expansion and contraction of the hoof while the horse is in motion; by their "smoothness," do not enlarge the nail holes in the hoof, while their "supreme excellence," in "holding power in the clinch," enables them to hold the shoe in the hardest service until worn out.

By the "use of small nails," large holes are avoided and money saved to the smith.

Thus it will be seen that the officials of the *World's Columbian Exposition* recognize what qualities go to make up a good horse nail and that only the "Putnam" contains them all.

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# FORGED CARRIAGE IRONS

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## CHAMPLAIN

Manufactured by the NATIONAL HORSE NAIL CO.,  
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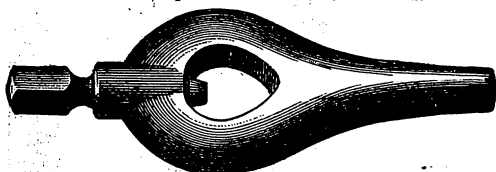
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## LE COUNT'S STRAIGHT TAIL DOG,

WITH STEEL SCREWS.

U. S. Standard, and the points hardened. To be driven from a stud in the face plate.  
It is from the same pattern as the Heavy Steel Dog, and warranted, like that, not to break with any work.



No.	Inch.	Price.	No.	Inch.	Price.
1	3/4	\$0 60	11	2 1/2	\$1 45
2	1	70	12	3	1 80
3	1 1/4	70	13	3 1/2	1 80
4	1 1/2	80	14	4	2 10
5	1 3/4	80	15	4 1/2	2 75
6	1 3/4	95	16	5	3 25
7	1 3/4	95	17	5 1/2	4 00
8	1 3/4	1 10	18	6	5 00
9	2	1 20	19	7	8 00
10	2 1/4	1 35	20	8	7 00

One set to 2 inch, \$7.80. Full set, \$14.10

This pattern will stand much more than a bent tail, and some prefer them on account of their direct action on the work.

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These goods are for sale by CHAS. CHURCHILL & CO., Ltd., 21 Cross St., London, England.



Before. After.

## Covert Pants Stretcher.

THE Covert "Pants Stretcher" will restore the pantaloons to their original shape and length.  
It removes all **WRINKLES** and **BAGGING** AT THE KNEES, giving them the appearance of having just left the tailor's hands.

It also holds the pants in a convenient position for brushing and cleaning.

The Stretcher cannot get out of order, and can be adjusted in the pants in a few seconds.

It being applied inside the pants, it obviates all objections prominent in other stretchers.

It is made of steel wire, and being in sections can be packed in a valise when traveling. Sold by the trade, or

Sample pair sent by mail to any address, free of postage, on receipt of \$1.00.

MANUFACTURED ONLY BY

COVERT MFG. CO., West Troy, N. Y.

**P. F. BURKE, C. F. DEWICK & CO.**  
Successor to  
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**PATENT STEEL**  
(Blunt and Sharp)  
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—ALSO—  
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FOOT VICE.  
Send for Circulars.  
360 BOSTON ST. Die for Welding  
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Horse and Mule Shoes,  
BAR IRON.

CRESCENT HORSE SHOE  
IRON CO.

Max Meadows, Va.



## FROST'S ANTI-RATTLER

Pat. Jan. 20, 1880.

Cut One-half Size.  
Sample pair sent to any hardware or saddlery firm by addressing

The Frost Thill Spring Co.,  
Boston, Mass.

**P. J. Conroy & Co.,**  
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"CONROY"  
Refrigerator Door

Fasteners

Have rapidly supplanted all others.

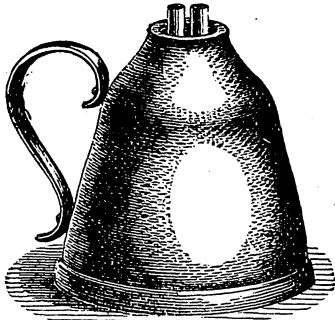
Refrigerator Trimmings.



Pat. Dec. 15, '85

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PATENTED ARTICLES  
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**Malleable Iron.**  
Hammer's Malleable Iron Hand Lamps.



SCREW, KEROSENE SIZE.

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Hammer's M. I. Hanging Lamps.

**NEW** pattern Heavy Screw Clamps  
strongest in the Market.

For sale by all the principal Hardware Dealers.

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**MALLEABLE IRON CASTINGS**

Of superior quality, and Hardware Specialties  
in Malleable Iron made to order.

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**HARDWARE DEALERS**

CAN RECOMMEND THE

**CHAMPION METAL WINDOW  
SASH CHAINS**

to their customers as a reliable substitute for  
Sash Cords, very strong and lasting (some in  
daily use ten years), and gives thorough satis-  
faction wherever used. The patented attach-  
ments are very simple and can be applied to  
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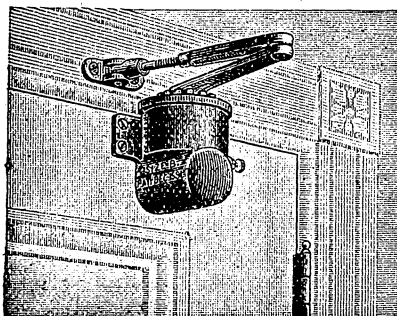
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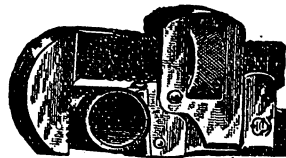


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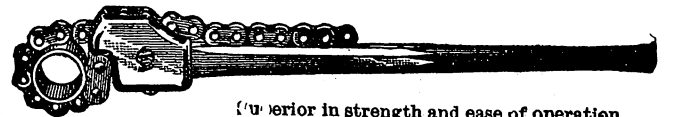
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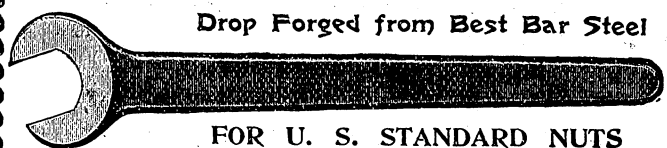
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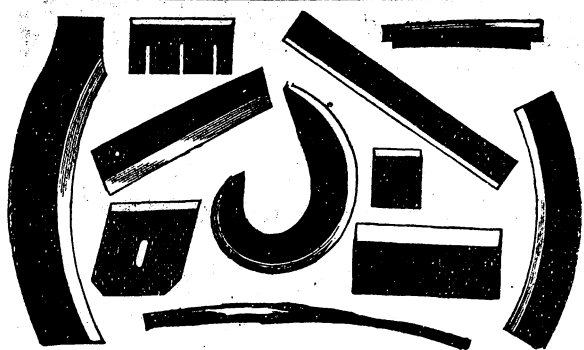


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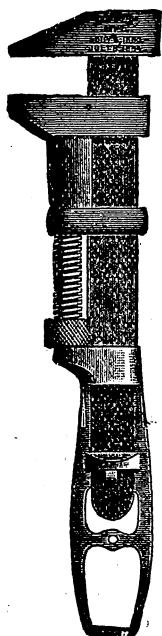
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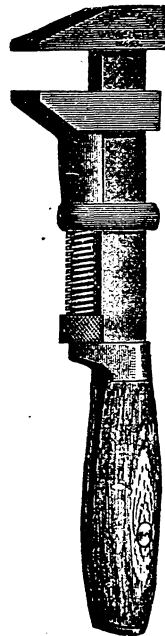
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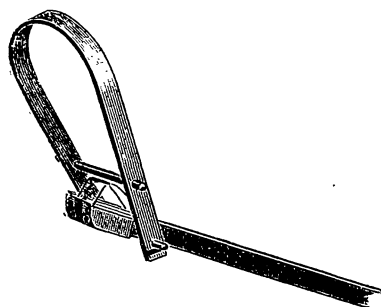
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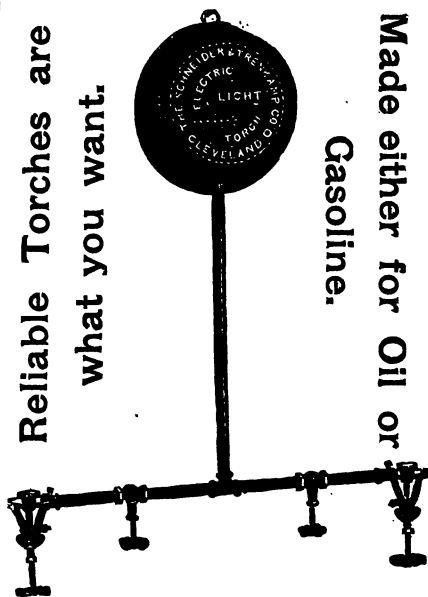


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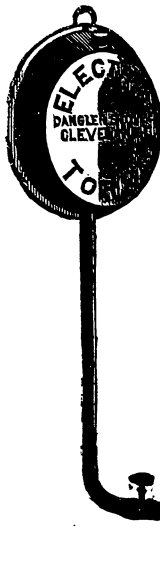
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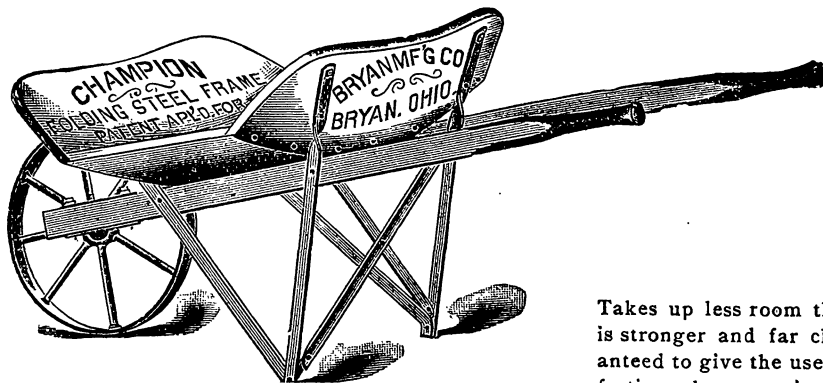
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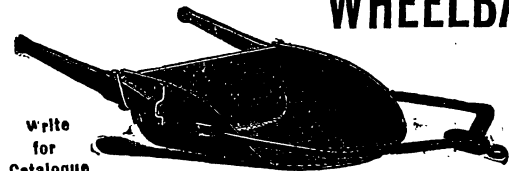
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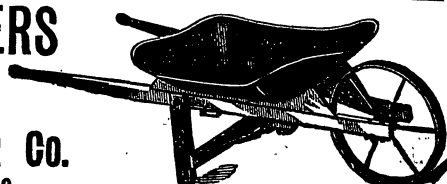
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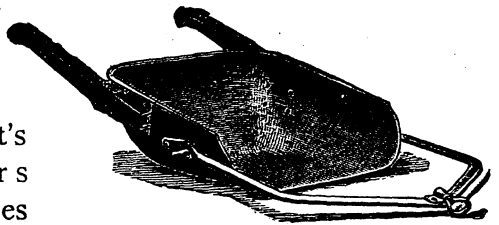


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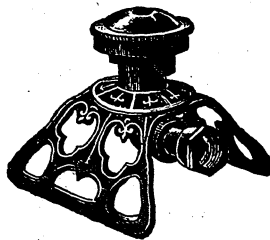
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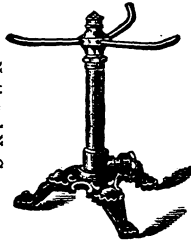


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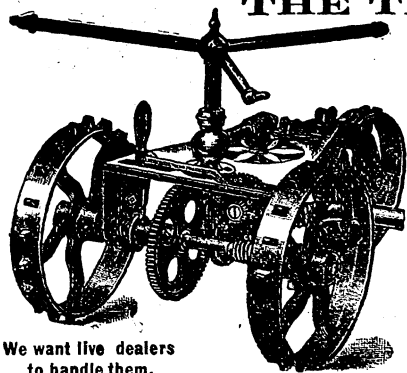
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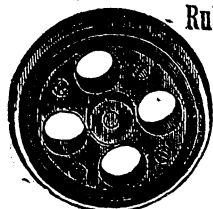


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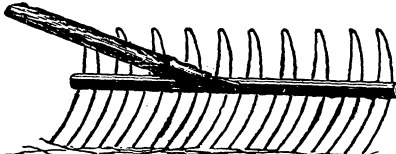
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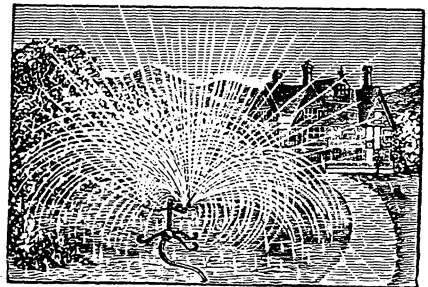


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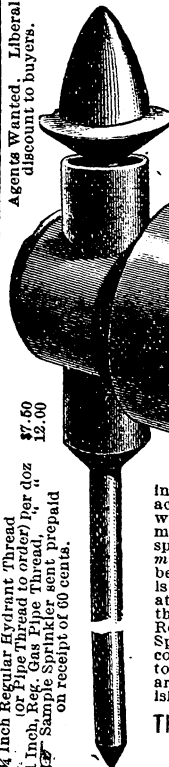
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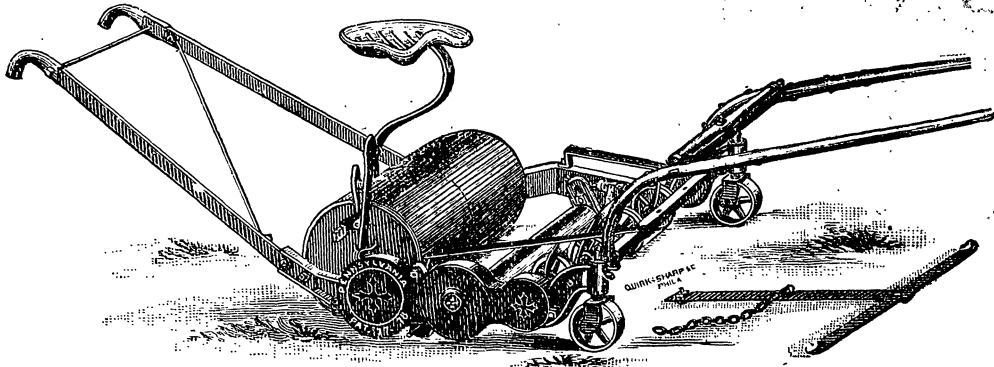
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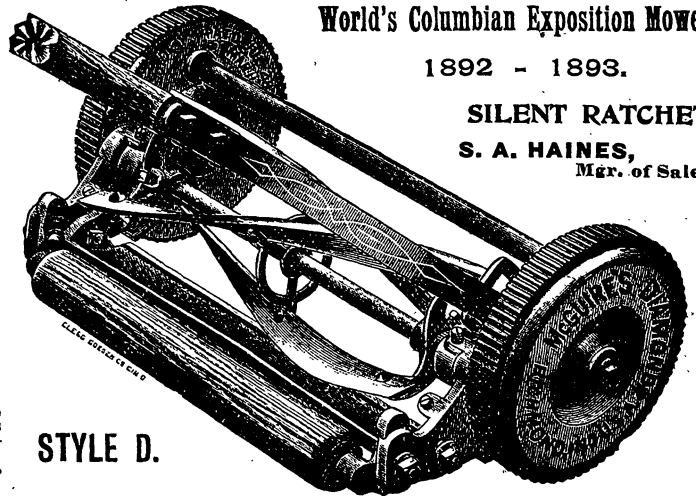
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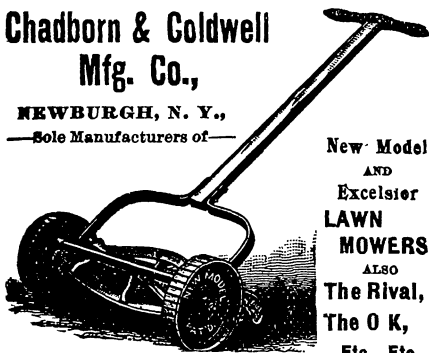
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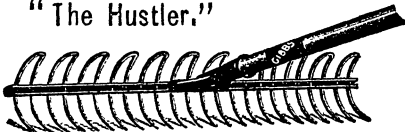
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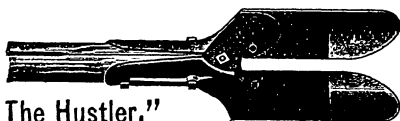
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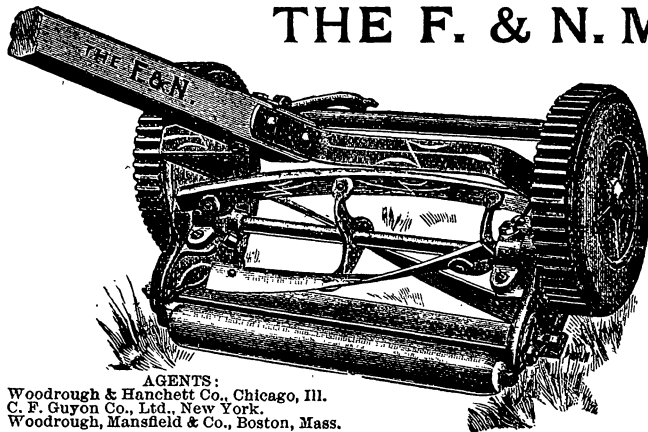


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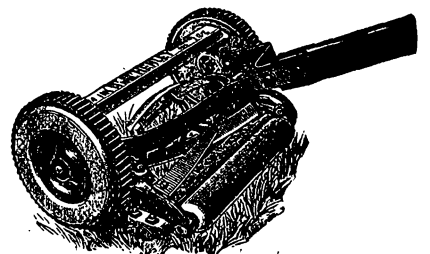
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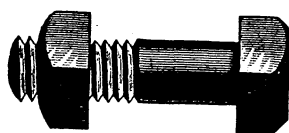
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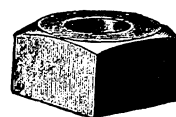
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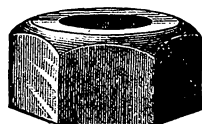
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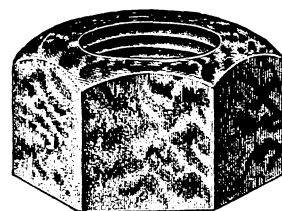
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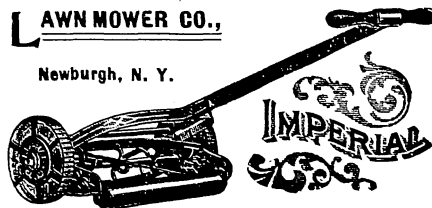
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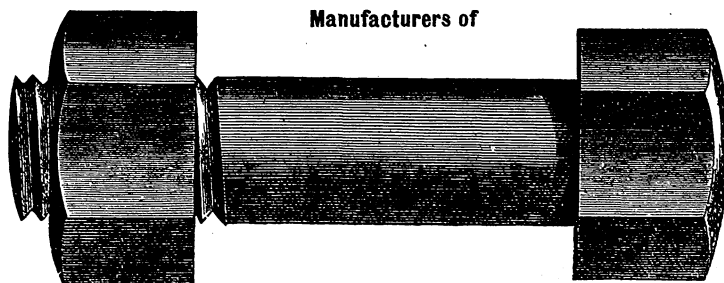
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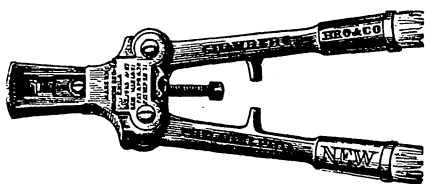
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Cambria Steel—Cambria Iron Co., Johnstown, Pa.  
Frankford Steel Co., Phila., Pa.  
Scranton Forging Co., Scranton, Pa.  
U. S. Projectile Co., Brooklyn, N. Y.

**Forks, Hay and Manure.**

Iowa Farming Tool Co., Ft. Madison, Iowa.

**Foundry Facings.**

Dixon, Jos., Crucible Co., Jersey City, N. J.  
S. Obermayer Co., Cincinnati, O.  
Smith, J. D., Fdy. Supply Co., Cin., O.

**Foundry Riddles.**

Estey, W. S., 65 Fulton, N. Y.

**Foundry Supplies.**

Diamond Clamp & Flask Co., Richmond, Ind.  
S. Obermayer Co., Cincinnati, O.  
Rice Mfg. Co., New Durham, N. H.  
Smith, J. D., Fdy. Supply Co., Cin., O.

**Friction Clutches.**

Brown, A. & F., 17 Day St., N. Y.  
Keystone Clutch & Mch. Wks., Phila., Pa.  
Moore & White Co., Philadelphia, Pa.

**Friction Cone.**

Evans Friction Cone Co., Boston, Mass.

**Furnaces, Foundry.**

Byram & Co., Detroit, Mich.

**Galvanized Material.**

Jersey City Galvanizing Co., 112 John St., N. Y.

**Gas Producers.**

Wood, R. D. & Co., Philadelphia, Pa.

**Gas & Steam Fitters' Supplies.**

Pancoast, Henry B. & Co., Phila., Pa.

**Gate Hinges.**

Wrightsville Hdw. Co., Wrightsville, Pa.

**Gauge, Rolling Mill.**

Haines Gauge Co., Philadelphia, Pa.

**Gear Cutters.**

D. E. Whiton Mach. Co., New London, Conn.

**Gears.**

Boston Gear Works, Boston, Mass.  
Lincoln Iron Works, Rutland, Vt.  
Pole, Robt. & Son Co., Baltimore, Md.  
U. S. Projectile Co., Brooklyn, N. Y.

**Glass Boards.**

Canton Saw Co., Canton, O.

**Glass Cutters.**

Monce, S. G., Bristol, Conn.

**Glue.**

Baeder, Adamson & Co., Phila., Pa.  
Dodd, A. W. & Co., Gloucester, Mass.  
Russia Cement Co., Gloucester, Mass.

**Grass Catchers.**

Supplee Hardware Co., Phila., Pa.

**Grinding Mills.**

Foss Mfg. Co., Springfield, O.

**Grinding and Polishing Machines.**

Norton Emery Wheel Co., Worcester, Mass.

**Grindstone Dressing Machinery.**

Blake & Johnson, Waterbury, Conn.

**Grindstones.**

Cleveland Stove Co., Cleveland, O.

**Gunpowder, Makers of.**

Lafin & Rand Powder Co., 29 Murray St., N. Y.

**Handles.**

New York Mallet and Handle Wks., 456 E. Houston St., N. Y.

**Hangers, Door.**

Chicago Spring Butt Co., Chicago, Ill.  
Coburn Trolley Track Mfg. Co., Holyoke, Mass.  
Lane Bros., Poughkeepsie, N. Y.

**Hardware Comm'n Merchants.**

Graham, John H. & Co., 111 Chambers St., New York.  
Jacobus, W. H., 90 Chambers, N. Y.

**Hardware Manufacturers.**

Stearns, E. C. & Co., Syracuse, N. Y.  
Union Mfg. Co., 103 Chambers, N. Y.  
Yale & Towne Mfg. Co., Stamford Conn.

**Hardware Mfrs.' Agents.**

Bingham, W. Co., Cleveland, O.  
Clarke, Thomas, St. John, N. B.  
Graham, John H. & Co., 113 Chambers.  
Sickles, Sweet & Lyon, 35 Barclay, N. Y.

**Hardware Specialties.**

Acme Shear Co., Bridgeport, Conn.  
Berger Bros., Philadelphia, Pa.  
Bourke Mfg. Co., Youngstown, O.  
Enterprise Mfg. Co., Philadelphia, Pa.  
Ette & Henger Mfg. Co., St. Louis, Mo.  
Haines & Zimmerman, Phila., Pa.  
Johnson, S. C., Racine, Wis.

**North Bros. Mfg. Co., Philadelphia, Pa.**

Peabody & Parks, Troy, N. Y.  
Scranton & Co., New Haven, Conn.  
Wilson, J. F., Worcester, Mass.  
Wrightsville Hdw. Co., Wrightsville, Pa.

**Harness Snaps.**

Covert Mfg. Co., West Troy, N. Y.  
Covers' Saddlery Wks., Farmer, N. Y.  
Fitch, W. & E. T., New Haven, Conn.

**Hog Rings and Ringers.**

Oakes & Irwin, Decatur, Ill.

**Hoisting Machines.**

Box, Alfred & Co., 314 Green, Phila.  
Brown Hoisting & Conveying Mch. Co., Cleveland, Ohio.  
Fulton Iron & Engine Wks., Detroit, Mich.  
Harrington, E. Son & Co., Phila.  
Lane Bros., Poughkeepsie, N. Y.  
Lidgerwood Mfg. Co., 96 Liberty, N. Y.  
Lincoln Iron Works, Rutland, Vt.  
McCoy, Jos. F. & Co., 26 Warren St.  
Maris & Beekley, Philadelphia.  
Moore Mfg. & Fdy. Co., Milwaukee, Wis.  
Morse, Williams & Co., Phila.  
Sellers, Wm. & Co., Phila. and N. Y.  
Yale & Towne Mfg. Co., Stamford, Ct.

**Hollow Ware.**

Avery Stamping Co., Cleveland, O.  
Bronson Supply Co., Cleveland, Ohio.  
Cleveland Stamping & Tool Co., Cleveland, O.  
Stuart & Peterson Co., Phila., Pa.

**Horse Nails, Makers of.**

Capewell Horse Nail Co., Hartford, Conn.  
National Horse Nail Co., Vergennes, Vt.  
Putnam Nail Co., Neponset, Boston, Mass.

**Horse and Mule Shoes, Makers of.**

Bryden Horse Shoe Co., Catsasauqua, N. Y.  
Burden Iron Co., Troy, N. Y.  
Crescent Horse Shoe & Iron Co., Max Meadows, Va.  
Diamond State Iron Co., Wilmington, Del.  
Old Dominion Iron & Nail Works Co., Richmond, Va.  
Phoenix Horse Shoe Co., Poughkeepsie, N. Y.  
Rhode Island Perkins Horse Shoe Co., Providence.  
Shoenberger & Co., Pittsburgh, Pa.  
Standard Horse Shoe Co., Boston, Mass.

**Hose Menders.**

Hudson, C. E. & Co., Leominster, Mass.  
Jones, M. D. & Co., Boston, Mass.

**Hose.**

Cleveland Rubber Works, Cleveland, O.  
N. Y. Belting & Packing Co., Ltd., 15 Park Row, N. Y.

**Hydrants, &c.**

McLean, John, 296 & 298 Monroe, N. Y.

**Hydraulic Forging.**

U. S. Projectile Co., Brooklyn, N. Y.

**Hydraulic Jacks.**

Dudgeon, Richard, 24 Columbia, N. Y.  
McCoy, Jos. F. Co., 26 Warren St., N. Y.

**Ice Breakers.**

Clement & Dunbar, Philadelphia, Pa.  
Wharton, Jos. S. Lovering, Phila., Pa.

**Ice Cream Freezers.**

Clement & Dunbar, Phila., Pa.  
North Bros. Mfg. Co., Phila., Pa.  
Packer, C. W., Philadelphia, Pa.  
White Mountain Freezer Co., Nashua, N. H.

**Injectors.**

Eynon-Evans Mfg. Co., Philadelphia, Pa.  
Jenkins Bros., New York.

**Insurance, Boiler.**

Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

**Iron and Steel, Swedish.**

Lindberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.

**Iron Commission Brokers.**

Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. W. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lea, J. Tatnall & Co., Philadelphia.  
Mohr, J. J., 430 Walnut, Philadelphia, Pa.  
Pilling & Crane, Philadelphia, Pa.  
Wister, L. & R. Co., Phila., Pa.

**Iron Ore.**

Samuel, Frank, Philadelphia, Pa.

**Iron Merchants.**

Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Bussenius & Cumliffe, Philadelphia.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 446 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Green St., N. Y.  
Pierson, N. Y.  
Thomson, W. H. & Co., Phila., Pa.  
Wallace, Wm. H. & Co., 66 B'way, N. Y.  
Whitney, A. R. & Co., 17 B'way, N. Y.  
Wilson, E. H. & Co., Philadelphia.

**Iron Importers.**

Abbott, Wheelock & Co., N. Y. and Boston.  
Lundberg, Gustaf, Boston, Mass.

**Iron, Sheet, Manufacturers of.**

Cambridge Iron & Steel Co., Cambridge, Ohio.  
W. Dewees Wood Co., Elm., McKeesport, Pa.

**Iron Vases.**

Walbridge & Co., Buffalo, N. Y.

**Ironwork, Ornamental.**

Barnum, E. T., Detroit, Mich.  
Champion Iron Co., Kenton, O.  
Ludlow-Saylor Wire Co., St. Louis, Mo.  
Mast, Foss & Co., Springfield, O.  
The Van Dorn Iron Works Co., Cleveland, O.

**Keys.**

Wollensak, J. F., Chicago, Ill.

**Ladies.**

Detroit Fdy. Equipment Co., Detroit, Mich.

**Lamps.**

Standard Lighting Co., Cleveland, O.

**Lanterns.**

Steam Gauge & Lantern Co., Syracuse, N. Y.

**Lathes.**

Dietz, Schumacher & Co., Cincinnati, O.  
Draper Machine Tool Co., Worcester, Mass.

Harrington, E. Son & Co., Phila., Pa.  
Johnson, Israel H., Jr. & Co., Philadelphia, Pa.  
New Haven Mfg. Co., New Haven, Conn.  
Sebastian Lathe Co., Cincinnati, O.  
Seneca Falls Mfg. Co., Seneca Falls, N. Y.

Lathing, Wire.

Clinton Wire Cloth Co., Clinton, Mass.  
N. J. Wire Cloth Co., Trenton, N. J.  
Wright & Colton Wire Cloth Co., Worcester, Mass.

**Laundry Machines.**

Johnson, S. C., Racine, Wis.

**Lawn Mowers.**

Blair Mfg. Co., Springfield, Mass.  
Chadborn & Coldwell Mfg. Co., Newburg, N. Y.  
Coldwell Lawn Mower Co., Newburg, N. Y.  
Dille & McGuire Mfg. Co., Richmond, Ind.

Enterprise Mfg. Co., Philadelphia, Pa.  
F. & N. Mfg. Co., Richmond, Ind.  
Henley, M. C., Richmond, Ind.  
Mast, Foss & Co., Springfield, O.  
Supplee Hdw. Co., Phila., Pa.

**Lawn Rakes.**

Gibbs Mfg. Co., Canton, Ohio.  
Kohler, F. E. & Co., Canton, O.

**Lawn Sprinklers.**

Blair Mfg. Co., Springfield, Mass.  
Enterprise Mfg. Co., Phila., Pa.  
Ette & Henger Mfg. Co., St. Louis, Mo.  
Gibbs Mfg. Co., Canton, Ohio.  
McGowan, John H. Co., Cincinnati, O.  
Portland Lawn Sprinkler Co., Portland, Me.

**Lemon Squeezers.**

Ripley Mfg. Co., Unionville, Conn.

**Letters and Figures, Metallic.**

White, A. A. & Co., Providence, R. I.

**Letters, Paper.**

Tablet & Ticket Co., Chicago, Ill.

**Levels.**

Richardson, C. F. & Son, Athol, Mass.

**Locks and Knobs, Manufacturers of.**

Deitz, A. E. & 97 Chambers, N. Y.  
Independent Electric Co., Chicago, Ill.  
Reading Hdw. Co., Reading, Pa.  
Smith & Egge Mfg. Co., Bridgeport, Conn.  
Yale & Towne Mfg. Co., Stamford, Conn.

**Lubricants.**

Dixon, Jos., Crucible Co., Jersey City, N. J.

**Machinery.**

Am. Tool Works, Cleveland, Ohio.  
Ayer, H. C. & Gleason Co., Phila., Pa.  
Barnes, W. F. & John, Rockford, Ill.  
Bement, Miles & Co., Philadelphia, Pa.  
Bigelow, C. E., 45 Dey, N. Y.  
Bisnall & Keeler Mfg. Co., St. Louis.  
Bliss, E. W. Co., Brooklyn, N. Y.  
Bridgeport Mch. Tool Works, Bridgeport, Conn.  
Briggs, Marvin, 12 Broadway, N. Y.  
Carlin's Sons, Thos., 118 E. 1st, Pa.  
Clapp, Geo. M., agt., 74 Cortlandt, N. Y.  
Dietz & Harvey Mch. Co., Baltimore, Md.  
Dietz, Schumacher & Co., Cincinnati, Ohio.

Fitchburg Mch. Works, Fitchburg, Mass.

Garvin Mch. Co., Lighthouse & Canal Sts.

Gould & Eberhardt, Newark, N. J.

Hamilton Mch. Tool Co., Hamilton, O.

Harrington, E. Son & Co., Phila., Pa.

Henderer, A. L., Wilmington, Del.

Hendey Machine Co., Torrington, Ct.

Hill, Clarke & Co., Boston, Mass.

Howard & Morse, 45 Fulton St., N. Y.

Hulbut-Rogers Mch. Co., South Sudbury, Mass.

Johnson, Israel H., Jr. & Co., Phila.

Jones & Lamson Mch. Co., Springfield, Vt.

Lodge & Davis Mch. Tool Co., Cincinnati, O.

- Place, Geo., 145 Broadway, N. Y.  
 Poole, Robt. & Son Co., Baltimore, Md.  
 Powell Planer Co., Worcester, Mass.  
 Pratt & Whitney Co., Hartford, Conn.  
 Prentiss Tool & Supply Co., N. Y.  
 Scranton Supply & Mchry. Co., Scranton, Pa.  
 Sellers, Wm. & Co., Phila.  
 Seyfert's Sons, L. F., Philadelphia, Pa.  
 Sigourney Tool Co., Hartford, Conn.  
 Steptoe, J. & Co., Cincinnati, O.  
 Stow Flexible Shaft Co., Ltd., Phila.  
 Toomey, Frank, Philadelphia, Pa.  
 Wetherill, Robert & Co., Chester, Pa.  
 Wickes Bros., Saginaw, Mich.  
 Wilson, W. A., Rochester, N. Y.
- Machinery for Hardware Manufacturers.**  
 Adt, Jno. & Son, New Haven, Conn.
- Machine Knives.**  
 Loring, Coes & Co., Worcester, Mass.  
 Loyd, John, 558-562 Water St., N. Y.  
 Simonds Mfg. Co., Fitchburg, Mass.  
 New Britain Hdw. Mfg. Co., New Britain, Conn.
- Machine Tools.—See Machinery.**
- Machine Work.**  
 Papping, J., 58th St. & 11th Ave., N. Y. City.
- Machinists' Scales.**  
 Coffin & Leighton, Syracuse, N. Y.  
 Starrett, L. S., Athol, Mass.
- Machinists' Tools and Supplies.**  
 King, J. M. & Co., Waterford, N. Y.  
 Sellers, Wm. & Co., Inc., Phila.
- Mallets.**  
 N. Y. Mallet & Handle Works, N. Y.
- Mangles.**  
 Johnson, S. C., Racine, Wis.
- Manufacturing Sites.**  
 Illinois Central R. R., Chicago, Ill.
- Measuring Tapes.**  
 Keuffel & Esser Co., N. Y.  
 Lufkin Rule Co., Saginaw, Mich.
- Meat Choppers.**  
 Claus Shear Co., Fremont, Ohio.
- Mechanical Instruction.**  
 Correspondence School of Mechanics, Scranton, Pa.  
 Rose Polytechnic Institute, Terre Haute, Ind.
- Metals.**  
 Fearing, Wm. S., 100 Chambers, N. Y.  
 Hendricks Bros., 49 Cliff, N. Y.
- Metal Brokers.**  
 American Metal Co., N. Y.
- Metallurgists.**  
 Britton, J. Blodgett, Phila., Pa.
- Mincing Knives.**  
 Palmer Hdw. Mfg. Co., Troy, N. Y.
- Mine Lamps.**  
 Darby, Edw. & Sons, Phila., Pa.  
 Leonard, B. E., Scranton, Pa.
- Mining Screens.**  
 Harrington & King Perforating Co., Chicago, Ill.  
 Howard & Morse, 45 Fulton, N. Y.
- Models, Makers of.**  
 Franklin, H. H. Mfg. Co., Syracuse, N. Y.  
 Ideal Machine Works, Hartford, Conn.
- Molding Sand.**  
 Obermayer, S. Co., Cincinnati, O.
- Motors, Water and Electric.**  
 C. & C. Electric Co., 402 and 404 Greenwich St., N. Y.  
 Dallett, Thomas H. & Co., Phila., Pa.
- Nail Machinery.**  
 Pittsburgh Mfg. Co., Pittsburgh, Pa.
- Nail and Tack Pullers.**  
 Scranton & Co., New Haven, Conn.  
 Specialty Mfg. Co., Hartford, Conn.
- Nails (Cut) and Spikes.**  
 Borden & Lovell, 70 West, N. Y.  
 Cumberland Nail & Iron Co., Phila.  
 Pottstown Iron Co., Pottstown, Pa.  
 Riverside Iron Works, Wheeling, W. Va.  
 Valley Steel Co., St. Louis, Mo.
- Nickel Platers' Supplies.**  
 Eddy Electric Mfg. Co., Windsor, Conn.
- Nickel Plating.**  
 Rhodes, L. E. Co., Hartford, Conn.
- Norway Shapes, Rollers of.**  
 Rowland, William & Harvey, Frankford, Philadelphia.
- Novelty Manufacturers.**  
 Franklin, H. H. Mfg. Co., Syracuse, N. Y.  
 Ideal Machine Works, Hartford, Conn.  
 Ransom Hdw. Co., Burlington, Vt.
- Nut Machines.**  
 Dunham Nut Co., Unionville, Ct.
- Nuts, Bolts, &c., Makers of.**  
 American Bolt Co., Lowell, Mass.  
 American Screw Co., Providence, R. I.  
 Blake & Johnson, Waterbury, Conn.  
 Dunham Nut Co., Unionville, Conn.  
 Haskell, Wm. H. Co., Pawtucket, R. I.  
 Mt. Carmel Bolt Co., Mt. Carmel, Conn.  
 Pennsylvania Bolt & Nut Co., Lebanon, Pa.  
 Port Chester Bolt & Nut Co., Port Chester, N. Y.  
 Russell, Burdall & Ward, Port Chester, N. Y.  
 Sternbergh, J. H. & Son, Reading, Pa.  
 Wilson, J. F., Worcester, Mass.  
 Wm. H. Haskell Co., Pawtucket, R. I.
- Oilers.**  
 Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Oil Stones.**  
 Pike Mfg. Co., Pike Station, N. H.
- Ores.**  
 Wister, Francis, Philadelphia, Pa.
- Ox Shoes.**  
 Scranton Forging Co., Scranton, Pa.
- Packing.**  
 Morrison, Robert, St. Louis, Mo.  
 N. Y. Belting & Packing Co., Ltd., N. Y.
- Padlocks.**  
 Ames Sword Co., Chicopee, Mass.  
 Fram, E. T., Lancaster, Pa.  
 Independent Electric Co., Chicago, Ill.  
 Shulze Mfg. Co., Phila., Pa.  
 Wolf, W. & L., Phila., Pa.
- Paint.**  
 Garry Iron & Steel Roofing Co., Cleveland, O.
- Paint Burners.**  
 Dangler Stove & Mfg. Co., Cleveland, Ohio.
- Paint Cans.**  
 Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Pants Stretcher.**  
 Covert Mfg. Co., West Troy, N. Y.
- Patent Solicitors.**  
 Butler, C. N., Phila., Pa.  
 Ewson & Ewson, Philadelphia and Washington.  
 Stocking, E. B., Washington, D. C.
- Pattern Letters.**  
 Wells, Heber, 157 William St., N. Y.
- Perforated Metal.**  
 Clinton Wire Cloth Co., Clinton, Mass.  
 Harrington & King Perforating Co., Chicago, Ill.  
 Hendrick Mfg. Co., Ltd., Carbondale, Pa.
- Phosphor Bronze.**  
 Phosphor Bronze Smelting Co., Limited, Philadelphia.
- Phosphor Tin.**  
 Crescent Phosphorized Metal Co., Philadelphia, Pa.  
 Halk & Naumann, 518 Pearl, N. Y.
- Picks and Mattocks.**  
 Plumb, Fayette R., Philadelphia, Pa.
- Pig Iron.**  
 Houston, C. B. & Co., Philadelphia, Pa.  
 Monitor Iron & Steel Co., Danville, Pa.  
 Naylor & Co., 45 Wall, N. Y.  
 Pilling & Crane, Philadelphia, Pa.  
 Samuel, Frank, Philadelphia, Pa.
- Pig Iron Storage.**  
 Am. Pig Iron Storage Warrant Co., 44 Wall, N. Y.
- Pile Drivers.**  
 Vulcan Iron Works, Chicago, Ill.
- Pipe, Bent.**  
 National Pipe Bending Co., New Haven, Conn.
- Pipe Cutting and Threading Machines.**  
 Armstrong Mfg. Co., Bridgeport, Conn.  
 Bignall & Keeler Mfg. Co., St. Louis, Mo.  
 Detrick & Harvey Mch. Co., Baltimore, Md.  
 Merrill Mfg. Co., Toledo, O.  
 Pancoast, Henry B. & Co., Phila.  
 Saunderson's Sons, D., Yonkers, N. Y.  
 Walworth Mfg. Co., Boston, Mass.
- Pipe Grips.**  
 Prentiss Vise Co., 44 Barclay, N. Y.
- Pipes, Fittings, &c., Makers of.**  
 McNab & Harlin Mfg. Co., N. Y.
- Pipe, Water and Gas, Makers of.**  
 Cumberland Nail & Iron Co., Phila., Pa.  
 Donaldson Iron Co., Emaus, Pa.  
 Riverside Iron Works, Wheeling, W. Va.  
 Wood, R. D. & Co., Philadelphia, Pa.
- Plane Irons, Manufacturers of.**  
 Buck Bros., Millbury, Mass.  
 Buck, Chas., Millbury, Mass.
- Planers.**  
 Detrick & Harvey Mch. Co., Baltimore, Md.  
 New Haven Mfg. Co., New Haven, Conn.  
 Powell Planer Co., Worcester, Mass.  
 Wilson, W. A., Worcester, Mass.
- Planes, Manufacturers of.**  
 Stanley Rule & Level Co., N. Y.
- Plated Ware.**  
 Boardman, L. & Son, New Haddam, Ct.  
 Holmes & Edwards Silver Co., Bridgeport, Conn.  
 Kelley & McBean, Niagara Falls, N. Y.  
 Rogers, Wm. Mfg. Co., Hartford, Ct.
- Plate, Iron and Steel, Mfrs. of.**  
 Aetna-Standard Iron & Steel Co., Bridgeport, O.  
 Lukens Iron & Steel Co., Coatesville, Pa.  
 Mahoning Valley Iron Co., Youngstown, Ohio.  
 Moorhead-McLean Co., Pittsburgh, Pa.  
 McIlvain & Sons, Reading, Pa.  
 Pottstown Iron Co., Pottstown, Pa.  
 Pottsville Iron & Steel Co., Pottsville, Pa.  
 Sager, Nimaick & Co., Pittsburgh, Pa.  
 The Mahoning Valley Iron Co., Youngstown, O.  
 Wood, Alan Co., Philadelphia.
- Plating, Nickel, Brass and Silver.**  
 Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Pokes.**  
 Bishop, A. W., Berea, Ohio.
- Polishing Machines.**  
 Watson & Stillman, 201 E. 43d, N. Y.
- Post Hole Diggers.**  
 Gibbs Mfg. Co., Canton, Ohio.  
 Kohler, F. E. & Co., Canton, O.
- Poultry Nettings.**  
 Barnum, E. T., Detroit, Mich.  
 Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.  
 N. J. Wire Cloth Co., Trenton, N. J.  
 "Silver Finish."  
 Tyler Wire Works Co., W. S., Cleveland, O.  
 Wright & Colton Wire Cloth Co., Worcester, Mass.
- Powder.**  
 Lafin & Rand Powder Co., 29 Murray, New York Powder Co., 62 Liberty St., N. Y.
- Power Hack Saws.**  
 Millers Falls Co., 98 Reade St., N. Y.
- Power Hammers.**  
 Dienelt & Eisenhardt, Philadelphia.  
 Dupont Mfg. Co., St. Johnsbury, Vt.  
 Jenkins & Lingle, Bellefonte, Pa.  
 Scranton & Co., New Haven, Conn.
- Power Transmitting Machinery.**  
 Dodge Mfg. Co., Mishawaka, Ind.
- Presses, Dies, &c.**  
 E. W. Bliss Co., Brooklyn, N. Y.  
 Crosby, G. A. & Co., Chicago, Ill.  
 Stark Mch. & Tool Co., Buffalo, N. Y.  
 Stiles & Parker Press Co., Brooklyn, N. Y.  
 Waterbury Mch. Co., Waterbury, Ct.
- Presses, Power, Makers of.**  
 Bliss, E. W. Co., Brooklyn, N. Y.  
 Manville, E. J. Mch. Co., Waterbury, Ct.  
 Stark Mch. & Tool Co., Buffalo, N. Y.  
 Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
- Pulleys.**  
 Brown, A. & F., 17 Dey St., N. Y.  
 Dodge Mfg. Co., Mishawaka, Ind.  
 Keystone Clutch Mch. Wks., Phila., Pa.  
 Lake, J. H. & D. Co., Massillon, O.
- Pulverizing Mills.**  
 Bradley Fertilizer Co., Boston, Mass.
- Pumping Machinery.**  
 Dean Bros. Steam Pump Works, Indianapolis, Ind.  
 Hooker-Colville Steam Pump Co., St. Louis, Mo.  
 McGowan, J. H. & Co., Cincinnati, O.  
 Maslin, J. & Son, Jersey City, N. J.  
 Norwalk Iron Works Co., So. Norwalk, Conn.  
 Southwark Fdy. & Mch. Co., Phila., Pa.  
 Valley Pump Works, Easthampton, Mass.  
 Worthington, Henry R., 86 and 88 Liberty St., N. Y.
- Pumps, Makers of.**  
 Bellevue Pump Co., Bellevue, Iowa.  
 Denzys Co., Salem, O.  
 Douglas, W. & B., Middletown, Conn.  
 Mast, Foss & Co., Springfield, O.  
 Myers, F. E. & Bro., Ashland, O.
- Punches.**  
 Richards, I. P., Providence, R. I.
- Punches and Shears, Hand and Power.**  
 E. W. Bliss Co., Brooklyn, N. Y.  
 Crosby, G. A. & Co., Chicago, Ill.  
 Henderer, A. L., Wilmington, Del.  
 Stark Mch. & Tool Co., Buffalo, N. Y.  
 Stiles & Parker Press Co., Brooklyn, N. Y.  
 Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.  
 Watson & Stillman, 201 E. 43d, N. Y.
- Rails, Old and New.**  
 Perry, W. H. & Co., Providence, R. I.
- Rat and Mouse Traps.**  
 Ester, W. S., 65 Fulton, N. Y.  
 Ripley Mfg. Co., Unionville, Conn.
- Razor Guard.**  
 Murphy, P. D., Lockport, N. Y.
- Reels.**  
 Hendryx, A. B. Co., New Haven, Conn.
- Refrigerator Door Fasteners.**  
 Conroy, P. J. & Co., Philadelphia.
- Rivets.**  
 Blake & Johnson, Waterbury, Conn.  
 Boyce Rivet Co., Muncie, Ind.  
 Burden Iron Co., Troy, N. Y.  
 Clark & Cowles, Plainville, Conn.  
 Cobb & Drew, Plymouth, Mass.  
 Sternbergh, J. H. & Son, Reading, Pa.  
 Townsend, W. F. & Co., New Brighton, Pa.
- Riveting Machines.**  
 Adt, Jno. & Sons, New Haven, Conn.
- Rock Drills.**  
 Band Drill Co., 23 Park Place, N. Y.
- Rolling Mill Machinery.**  
 Birmingham Iron F'dry, Birmingham, Ala.  
 Booth, The Lloyd Co., Youngstown, O.  
 Leeburg Foundry & Mch. Co., Pittsburgh, Pa.  
 Morgan Construction Co., Worcester, Mass.  
 Robinson-Rea Mfg. Co., Pittsburgh.  
 Totten & Hogg Iron and Steel F'dry Co., Pittsburgh, Pa.  
 Trethewey Mfg. Co., Pittsburgh, Pa.  
 Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.
- Rolls, Chilled, Sand and Steel.**  
 Birmingham Iron Foundry, Birmingham, Ala.  
 Booth, The Lloyd Co., Youngstown, O.  
 East Chicago F'dry Co., Chicago, Ill.  
 Garrison, A. F'dry Co., Pittsburgh, Pa.  
 Robinson-Rea Mfg. Co., Pittsburgh, Pa.  
 Seaman, Sleeth & Black, Pittsburgh.  
 Totten & Hogg Iron and Steel F'dry Co., Pittsburgh, Pa.
- Roofing.**  
 Berlin Iron Bridge Co., E. Berlin, Conn.  
 Cambridge Roofing Co., Cambridge, O.  
 Cincinnati Corrugating Co., Piqua, O.  
 Kanneberg Roofing Co., Canton, O.  
 N. Y. Iron Roofing & Corrugating Co., Jersey City, N. J.
- Rope and Web Goods.**  
 Covert Mfg. Co., West Troy, N. Y.  
 Covert's Saddlery Wks., Farmer, N. Y.
- Rope Wheels.**  
 Cresson, Geo. V. Co., Philadelphia, Pa.
- Rubber Goods.**  
 Canfield, H. O., Bridgeport, Conn.
- Rules, Manufacturers of.**  
 Keuffel & Esser Co., New York.  
 Lufkin Rule Co., Saginaw, Mich.  
 Stanley Rule & Level Co., 29 Chambers.
- Rust Preventive.**  
 Bridgeport Gun Implement Co., 313-315 Broadway, N. Y.
- Sand Paper.**  
 Baeder, Adamson & Co., Phila., Pa.
- Sash Balances.**  
 Caldwell Mfg. Co., Rochester, N. Y.  
 Pullman Sash Balance Co., Rochester, N. Y.  
 Stearns, E. C. & Co., Syracuse, N. Y.
- Sash Cords and Chains.**  
 Morton, Thos., 45 Elizabeth, N. Y.  
 Ossawan Mills Co., Norwich, Conn.  
 Samson Cordage Works, Boston, Mass.  
 Smith & Egge Mfg. Co., Bridgeport.
- Sash Pulleys.**  
 Palmer Hardware Mfg. Co., Troy, N. Y.
- Sash Weights.**  
 Brown, E. E. & Co., Philadelphia, Pa.  
 Norton Bros., Chicago, Ill.
- Saw Filing Machines.**  
 Disston, Henry & Sons, Philadelphia, Pa.
- Saws, Makers of.**  
 Disston, Henry & Sons, Phila., Pa.  
 National Saw Co., 98 Reade St., N. Y.  
 Simonds Mfg. Co., Fitchburg, Mass.
- Saw Vises.**  
 Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Saw Sets.**  
 Taintor Mfg. Co., 84-86 Chambers, N. Y.
- Scales, Manufacturers of.**  
 Buffalo Scale Co., Buffalo, N. Y.  
 Chatillon, John & Sons, 85-89 Cliff, N. Y.
- Scrapers, Road.**  
 Am. Steel Scraper Co., Sydney, Ohio.  
 Kilbourne & Jacobs Mfg. Co., Columbus, O.  
 Sidney Steel Scraper Co., Sidney, O.
- Screens, Coal and Ore.**  
 Hendrick Mfg. Co., Ltd., Carbondale, Pa.
- Screens, Door and Window.**  
 Phillips, A. J. & Co., Fenton, Mich.  
 White, Van Gland & Co., 15-17 Chatham Sq., N. Y.
- Screw Cutting Machinery.**  
 Wells Bros. & Co., Greenfield, Mass.  
 Wiley & Russell Mfg. Co., Greenfield, Mass.
- Screw Drivers.**  
 Brown, R. H. & Co., New Haven, Conn.  
 Mayhew, H. H. Co., Shelburne Falls, Mass.
- Screw Plate and Pipe Cutter.**  
 Jarecki Mfg. Co., Erie, Pa.
- Screws, Makers of.**  
 American Screw Co., Providence, R. I.  
 Blake & Johnson, Waterbury, Conn.  
 Wm. H. Haskell Co., Pawtucket, Mass.  
 Reynolds & Co., New Haven, Conn.  
 Worcester Machine Screw Co., Worcester, Mass.
- Scroll Saws.**  
 Barnes, W. F. & John, Rockford, Ill.  
 Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Scythe Stones and Whetstones.**  
 Pike Mfg. Co., Pike Station, N. H.  
 Cleveland Stone Co., Cleveland, O.
- Shafting, Makers of.**  
 Brown, A. & F., 17 Dey St., N. Y.  
 Cresson, Geo. V. Co., Philadelphia, Pa.  
 Fairmount Mch. Co., Philadelphia, Pa.  
 Sellers, Wm. & Co., Inc., Phila., Pa.  
 Stow Mfg. Co., Binghamton, N. Y.
- Shaft Support.**  
 Decatur Shaft Support Co., Decatur, Ill.
- Shaped Iron and Steel, Manufacturers of.**  
 Aetna-Standard Iron & Steel Co., Bridgeport, O.  
 East Chicago F'dry Co., Chicago, Ill.



Allentown Rolling Mill, Allentown, Pa.  
Lockhart Iron & Steel Co., Pittsburgh, Pa.  
Passaic Rolling Mill Co., Paterson, N.J.  
Pottsville Iron & Steel Co., Pottsville, Pa.  
Roberts, A. & P. & Co., Phila., Pa.  
The Phoenix Iron Co., Phila., Pa.

#### Shears and Scissors.

Aome Shear Co., Bridgeport, Conn.  
Heinrichs, R. Sons Co., Newark, N. J.

#### Sheet Iron and Steel, Manufacturers of.

Aetna-Standard Iron and Steel Co., Bridgeport, O.  
Cambridge Iron & Steel Co., Cambridge, Ohio.  
Chess Bros., Pittsburgh, Pa.  
Jersey City Galvanizing Co., 112 John St., N. Y.  
Mahoning Valley Iron Co., Livingston, Ohio.  
Morehead-McCleane Co., Pittsburgh, Pa.  
Pierson & Co., 29 Broadway, N. Y.  
Singer, Nimick & Co., Ltd., Pittsburgh, Pa.  
The Mahoning Valley Iron Co., Youngstown, O.  
Alan Wood Co., Philadelphia.  
W. Dewees Wood Co., McKeesport, Pa.

#### Sheet Zinc.

Mathiessen & Hegeler Zinc Co., La Salle, Ill.

#### Show Cases.

Union Show Case Co., Chicago, Ill.

#### Sinks.

Douglas, W. & B., Middletown, Conn.

#### Skates, Ice.

Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.

#### Skates, Roller.

Henley, M. C., Richmond, Ind.  
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.

#### Slag Machines.

Cambria Iron Co., Johnstown, Pa.

#### Smelting Works.

Reeves, Paul S., 760 S. Broad, Phila.

#### Soldering Coppers.

Cleaden Bros., Baltimore, Md.  
Covert Mfg. Co., West Troy, N. Y.

#### Speaking Tubes.

Ostrander, W. R. & Co., 204 Fulton St., N. Y.  
Wollensak, J. F., Chicago, Ill.

#### Spelter.

Mathiessen & Hegeler Zinc Co., La Salle, Ill.  
Missouri Metal Co., St. Louis, Mo.

#### Spoons and Forks.

Boardman, L. & Son, New Haddam, Conn.  
Holmes & Edwards Silver Co., Bridgeport, Conn.  
Kelley & McBean, Niagara Falls, N. Y.  
Rogers, The Wm. Mfg. Co., Hartford, Conn.

#### Sporting Goods.

Hartley & Graham, 313-315 B'way, N. Y.

#### Spring.

Clark & Cowles, Plainville, Ct.  
Dunbar Bros., Bristol, Conn.  
Miller & Van Winkle, Brooklyn, N. Y.  
Morgan Spring Co., Worcester, Mass.  
Roland, Wm. & Harvey, Phila., Pa.  
Sabin Machine Co., Montpelier, Vt.  
Washburn & Moen Mfg. Co., Worcester, Mass.  
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.

#### Spring Hinges.

Bommer Bros., Brooklyn, N. Y.  
Chicago Spring Butt Co., Chicago, Ill.  
Pulman Sash Balance Co., Rochester, N. Y.  
Stover Mfg. Co., Freeport, Ill.  
Van Wagoner & Williams Hdw. Co., 14 Warren St., N. Y.

#### Stamped Ware.

Am. Stamping Co., 104 & 106 John St., New York.

#### Stamping Works.

Avery Stamping Co., Cleveland, O.  
Cleveland Stamping & Tool Co., Cleveland, O.

#### Staples.

Cobb & Drew, Plymouth, Mass.  
Titchener, E. H. & Co., Binghamton, N. Y.

#### Steam Gauges.

Bristol Co., Waterbury, Conn.

#### Steam Hammers, &c., Makers of.

Dienelt & Eisenhardt, Philadelphia.  
Dudgeon, Richard, 24 Columbia Street, N. Y.  
Tretlow Mfg. Co., Pittsburgh, Pa.

#### Steam Heating & Oil Separators.

Webster, Warren & Co., Camden, N. J.

#### Steam Separators.

Goubert Mfg. Co., 32 Cortlandt St., N. Y.  
Harrison Safety Boiler Wks., Phila., Pa.  
Webster, Warren & Co., Camden, N. J.

#### Steam Specialties.

Lunkenheimer Co., Cincinnati, O.

#### Steel, Cold Rolled Strip.

Superior Steel Co., Pittsburgh, Pa.  
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.

#### Steel Figures and Alphabets.

Krogsrud, W., 61 Fulton St., N. Y.

#### Steel Importers.

Abbott, Wheelock & Co., N. Y. and Boston.  
Hobson, Francis, Seaman & Co., 97 John St., N. Y.  
Jessop, Wm. & Sons, Sheffield, England, or 81 John, N. Y.  
Milne, A. & Co., J. Broadway, N. Y.  
Newton & Shipman, 83 John, N. Y.  
Wetherell Bros., 93 Liberty St., N. Y.  
Whitney, A. R. & Co., B'dway, N. Y.  
Wolf, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.

#### Steel (Mushet's Special).

Jones, B. M. & Co., Boston.

#### Steel Manufacturers.

Aetna-Standard Iron & Steel Co., Bridgeport, O.  
Bethlehem Iron Co., S. Bethlehem, Pa.  
Baker, Hermann & Co., 103 Duane St. Carbon Steel Co., Pittsburgh, Pa.  
Chester Steel Castings Co., Phila., Pa.  
Chrome Steel Works, Brooklyn, N. Y.  
Crescent Steel Co., Pittsburgh, Pa.  
Frankford Steel Co., Philadelphia.  
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.  
Hobson, Francis, Seaman & Co., 97 John St., N. Y.  
Jessop, Wm. & Sons, Sheffield, England, or 81 John, N. Y.  
Kaiser, Ellison & Co., Sheffield, Eng.  
La Belle Steel Co., Pittsburgh, Pa.  
Lukens Iron & Steel Co., Coatesville, Pa.  
Moorhead-McCleane Co., Pittsburgh, Pa.  
Moss, F. W., 81 John, N. Y.  
Pottsville Iron and Steel Co., Pottsville, Pa.  
Bowland, Wm. & Harvey, Frankford, Philadelphia.  
Singer, Nimick & Co., Pittsburgh, Pa.  
Superior Steel Co., Pittsburgh, Pa.  
Valley Steel Co., St. Louis, Mo.  
Wardlaw, S. & Co., Sheffield, Eng.  
Wetherell Bros., 93 Liberty, N. Y.  
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.

#### Steel, Manufacturers' Agents.

Barns, C. K. & Co., Philadelphia, Pa.  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Lindsay, Jas. G. & Co., Phila., Pa.  
Pierson & Co., 20 Broadway, N. Y.

#### Steel Rails, Manufacturers of.

Bethlehem Iron Co., S. Bethlehem, Pa.  
Cambria Iron Co., Johnstown, Pa.  
Montour Iron & Steel Co., Danville, Pa.  
Riverside Iron Wks., Wheeling, W. Va.

#### Steel, Tool.

Frankford Steel Co., Philadelphia, Pa.  
Jessop, Wm. & Sons, Sheffield, England, or 81 John, N. Y.  
Jones, B. M. & Co., Boston, Mass.  
La Belle Steel Co., Pittsburgh, Pa.

#### Step Ladders, Rolling.

Bicycle Step Ladder Co., Chicago, Ill.  
Coburn Trolley Track Mfg. Co., Holyoke, Mass.  
Chamant, M., Albany, N. Y.  
Morley Bros., Saginaw, Mich.

#### Stocks and Dies.

Armstrong Mfg. Co., Bridgeport, Conn.  
Billings & Spencer Co., Hartford, Conn.  
Butterfield & Co., Derby Line, Vt.  
Hart Mfg. Co., Cleveland, O.  
Oster Mfg. Co., Cleveland, O.  
Saunders' Sons, D., Yonkers, N. Y.  
Wells Bros. & Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.

#### Stone Saws and Planers.

Lincoln Iron Works, Rutland, Vt.

#### Stoves, Gasoline.

Standard Lighting Co., Cleveland, O.

#### Stove Linings.

Ostrander Fire Brick Co., Troy, N. Y.

#### Stove Pipe Thimbles.

Cheney, S. & Son, Manlius, N. Y.

#### Street Lamps.

Steam Gauge & Lantern Co., Syracuse, N. Y.

#### Structural Iron Work.

Berlin Iron Bridge Co., East Berlin, Conn.  
Lindsay, Jas. G. & Co., Phila., Pa.

#### Sulphuric Acid.

Mathiessen & Hegeler Zinc Co., La Salle, Ill.

#### Tacks, Brads, Staples, &c.

Anthony & Cushman Tack Co., Taunton, Mass.  
Atlas Tack Corporation, Boston, Mass.  
Cleaden Bros., Baltimore, Md.  
Cobb & Drew, Plymouth, Mass.  
Grand Crossing Tack Co., Grand Crossing, Ill.

#### Taps and Dies.

Butterfield & Co., Derby Line, Vt.  
Carpenter, J. M., Tap & Die Co., Pawtucket, R. I.  
Manning, Maxwell & Moore, 111 Liberty St., N. Y.  
Wells Bros. & Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.

#### Testing Laboratories.

Riehle Bros. Testing Mach. Co., Philadelphia.

#### Testing Machines.

Riehle Bros. Testing Mach. Co., Phila.

#### Theatrical Hardware.

Wollensak, J. F., Chicago, Ill.

#### Thill Springs.

Frost Thill Spring Co., Boston, Mass.  
Sabin Machine Co., Montpelier, Vt.

#### Timber and Mineral Lands.

Robertson, E. Co., Cincinnati, O.

#### Time Record.

Scattergood, H. W., Phila., Pa.

#### Tin Plate Machinery.

Lloyd Booth Co., Youngstown, Ohio.

#### Tinware.

Am. Stamping Co., 104 & 106 John St.

#### Tire Upsetters.

Butts & Ordway, Boston, Mass.

#### Toe Calks, Steel.

Burke, P. F., Boston, Mass.

#### Tool Blocks.

Rulbut-Rogers Mch. Co., South Sudbury, Mass.

#### Tool Chests.

Am. Tool Co., 200 W. Houston St., N. Y.

#### Tool Holders.

Armstrong Bros. Tool Co., Chicago, Ill.

#### Tools.

Britton, Horace E., Stoughton, Mass.  
Brown, R. H. & Co., New Haven, Conn.  
Mayhew, H. H. Co., Shelburne Falls, Mass.  
Millers Falls Co., 93 Reade, N. Y.  
Richardson, C. F. & Son, Athol, Mass.  
Standard Tool Co., Athol, Mass.  
Stanley Rule & Level Co., 29 Chambers, New York, N. Y.  
Starratt, L. S., Athol, Mass.  
Wilkinson, A. J. & Co., Boston, Mass.

#### Tools, Blacksmith and Wheelwright.

Buffalo Forge Co., Buffalo, N. Y.  
Butts & Ordway, Boston, Mass.  
Champion Blower & Forge Co., Lancaster, Pa.  
Plumb, Fayette R., Philadelphia, Pa.  
Wiley & Russell Mfg. Co., Greenfield, Mass.

#### Tools, Steam and Gas Fitters'.

Saunders' Sons, D., Yonkers, N. Y.

#### Torches, Oil and Gasoline.

Dangle Stove & Mfg. Co., Cleveland, O.  
Schneider & Trenkamp Co., Cleveland, Ohio.

#### Transom Lifters.

Wollensak, J. F., Chicago, Ill.

#### Trucks, Manufacturers of.

Clark, G. F., Windsor Locks, Conn.

#### Tubes, Seamless Drawn Copper.

Andria Brass & Copper Co., 19 and 21 Cliff St., N. Y.  
Randolph & Clowes, Waterbury, Conn.

#### Tubes, Steel.

Leng's, John S. Son & Co., 4 Fletcher St., New York.  
U. S. Projectile Co., Brooklyn, N. Y.

#### Tumbling Barrels.

Henderson Bros., Waterbury, Conn.

#### Turnbuckles.

Cleveland City Forge & Iron Co., Cleveland, O.  
Merrill Bros., Brooklyn, E. D.

#### Twist Drills, Makers of.

Cleveland Twist Drill Co., Cleveland, O.  
Morse Twist Drill & Machine Co., New Bedford, Mass.  
New Process Twist Drill Co., Taunton, Mass.  
Standard Tool Co., Cleveland.

#### Valves, Gas, Water and Steam.

Chapman Valve Mfg. Co., Boston.  
Eynon-Evans Mfg. Co., Philadelphia, Pa.  
Jenkins Bros., 71 John, N. Y.  
Lunkenheimer Co., Cincinnati, O.  
McNab & Harlin Mfg. Co., 56 John, N. Y.

#### Ventilator Appliances.

Howard & Morse, 45 Fulton St., N. Y.

#### Vise Jaws.

Newark Mch. Tool Co., Newark, N. J.

#### Vises.

Hollands Mfg. Co., Erie, Pa.  
Howard Iron Works, Buffalo, N. Y.  
Millers Falls Co., 93 Reade St., N. Y.  
Prentiss Vise Co., 44 Barclay, N. Y.

#### Wagon Jacks.

Covert Mfg. Co., West Troy, N. Y.  
Covert's Saddlery Works, Farmer, N. Y.

#### Washers.

Haskell, Wm. H. Co., Pawtucket, R. I.  
Milton Mfg. Co., Milton, Pa.  
Sternberg, J. H. & Son, Reading, Pa.

#### Washing Machines.

Benbow Mfg. Co., St. Louis, Mo.

#### Watches.

Ingersoll, R. H. & Bro., 65 Cortlandt St., N. Y.

#### Water Meters.

Worthington, Henry R., 86 & 88 Liberty St., N. Y.

#### Water Wheels.

Poole, Robt. & Son Co., Baltimore, Md.

#### Wheelbarrows.

Amer. Steel Scraper Co., Sidney, Ohio.  
Bryan Mfg. Co., Bryan, Ohio.  
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.  
Sidney Steel Scraper Co., Sidney, O.

#### Window Cleaners.

Bourke Mfg. Co., Youngstown, O.

#### Window Cord, Makers of.

Samson Cordage Works, Boston, Mass.

#### Wire, Manufacturers of.

Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.  
Miller & Van Winkle, Brooklyn, N. Y.  
New Castle Wire Nail Co., New Castle, Pa.  
New Haven Wire Mfg. Co., New Haven, Conn.  
Salem Wire Nail Co., Salem, O.  
Trenton Iron Co., Trenton, N. J.  
Washburn & Moen Mfg. Co., Worcester.  
Wetherell Bros., 93 Liberty St., N. Y.  
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.  
Wright & Colton Wire Cloth Co., Worcester, Mass.

#### Wire Cloth.

Barnum, E. T., Detroit, Mich.  
Clinton Wire Cloth Co., Clinton, Mass.  
Darby, Edward & Sons, Philadelphia.  
Essey, W. S., 65 Fulton, N. Y.  
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.  
Howard & Morse, 45 Fulton, N. Y.  
N. J. Wire Cloth Co., Trenton, N. J.  
Scheeler & Sons, Buffalo, N. Y.  
Wickwire Bros., Cortland, N. Y.  
Wright & Colton Wire Cloth Co., Worcester, Mass.  
W. S. Tyler Wire Works Co., Cleve'd.

#### Wire Cutters.

Higginum Hdw. Co., Higginum, Conn.  
King, J. M. & Co., Watertown, N. Y.

#### Wire Dies.

McFarland, Wm., Trenton, N. J.  
Newton & Shipman, 83 John St., N. Y.

#### Wire Fences, See Fencing, Iron and Wire.

#### Wire Goods, Manufacturers of.

Bromwell Brush & Wire Goods Co., Cincinnati, Ohio.  
Darby, Edward & Sons, Phila.  
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.  
Ludlow-Saylor Wire Co., St. Louis.  
Ossawan Mills Co., Norwich, Conn.  
Scheeler & Sons, Buffalo, N. Y.  
Wickwire Bros., Cortland, N. Y.  
Williamson, C. T., Wire Novelty Co., Newark, N. J.  
Wire Goods Co., Worcester, Mass.

#### Wire Machinery.

Am. Tool Wks., Cleveland, O.  
Manville, E. J. Mch. Co., Waterbury, Ct.  
Morgan Construction Co., Worcester, Mass.  
Waterbury Mch. Co., Waterbury, Conn.

#### Wire Straightening and Cutting Machinery.

Adt, John & Son, New Haven Conn.

#### Wire Nails.

Bond Nail Co., Raynham, Mass.  
Indiana Wire Fence Co., Crawfordsville, Ind.  
Kilmer Mfg. Co., Newburg, N. Y.  
New Castle Wire Nail Co., New Castle, Pa.  
Phillips, Townsend & Co., Phila., Pa.  
Salent Wire Nail Co., Salem, O.  
Taunton Wire Nail Co., Taunton, Mass.  
Whitney, A. R. & Co., New York City.

#### Wire Rods, Steel.

New Castle Wire Nail Co., New Castle, Pa.  
Washburn & Moen Mfg. Co., Worcester, Mass.  
Whitney, A. R. & Co., 17 B'way, N. Y.  
Wolf, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.

#### Wire Rope, Iron and Steel, Makers.

Broderick & J. Baseom Rope Co., St. Louis, Mo.  
California Wire Works, San Francisco.  
Hazard Mfg. Co., Wilkesbarre, Pa.  
A. Leschen & Sons Rope Co., St. Louis.  
Trenton Iron Co., Trenton, N. J.  
Washburn & Moen Mfg. Co., Worcester, Mass.

#### Wire Rope Machinery.

Kay, J. F., Passaic, N. J.

#### Wood-Working Machinery.

Fay, J. A. & Co., Cincinnati, O.  
Seneca Falls Mfg. Co., Seneca Falls, N. Y.  
Wilkinson, A. J. & Co., Boston, Mass.

#### Wrenches, Manufacturers of.

Bemis & Call Hardware & Tool Co., Springfield, Mass.  
Billings, Spencer & Co., Hartford, Conn.  
Coes Wrench Co., Worcester, Mass.  
Trimont Mfg. Co., Roxbury, Pa.  
Walworth Mfg. Co., Boston, Mass.  
Williams, J. H., Brooklyn, N. Y.

#### Wringers.

Colby Wringer Co., Montpelier.  
National Wringer Co., Canton, O.

#### Yacht Hardware.

Ferdinand, L. W. & Co., Boston, Mass.



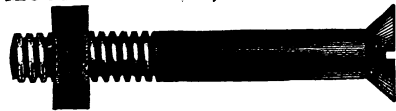
# ALPHABETICAL INDEX TO ADVERTISERS.

Abbott, Wheelock & Co.....	17	Bronson Supply Co.....	72	Crescent Phosphorized Metal Co.....	3	Graham, John H. & Co.....	73
Acme Shear Co.....	66	Brown, A. & F.....	41	Crescent Steel Co.....	15	Grand Crossing Tack Co.....	11
Adt, John & Son.....	39	Brown, E. E. & Co.....	77	Cresson, Geo. V. Co.....	41	Grand Rapids Cycle Co.....	68
Alma-Standard Iron & Steel Co.....	19	Brown Holsting & Conveying Mch.Co.	33	Croissant, M.....	73	Green, A. H.....	73
Alken, Henry.....	24	Brown, R. H. & Co.....	56	Crosby, G. A. & Co.....	36	Haight & Clark.....	3
Alexander Bros.....	34	Bryan Mfg. Co.....	84	Crown Smelting Co.....	3	Haines & Zimmermann.....	68
Allentown Hdw. Wks.....	26	Bryden Horse Shoe Co.....	79	Cumberland Nail & Iron Co.....	16	Haines Gauge Co.....	24
Allentown Rolling Mills.....	28	Buck Bros.....	65	Cushman Chuck Co.....	40	Halk & Naumann.....	3
Alsiste Aluminum Co.....	14	Buck, Chas.....	65	Dallett, Thos. H. & Co.....	42	Halsey, Jas. T.....	40
Am. Bolt Co.....	87	Buckeye Mfg Co.....	26	Dame, Stoddard & Kendall.....	69	Halsey, W. S. & Co.....	23
Am. Metal Co.....	3	Buffalo Forge Co.....	98	Dangler Stove & Mfg. Co.....	34	Hamilton Machine Tool Co.....	46
Am. Pig Iron & Storage Warrant Co.	18	Buffalo Scale Co.....	82	Darby, Edw. & Sons.....	8	Hammer & Co.....	82
Am. Screw Co.....	12	Burden Iron Co.....	79	Davis, I. B. & Son.....	29	Hardware Board of Trade.....	51
Am. Stamping Co.....	70	Burke, P. F.....	81	Davis, W. P.....	48	Harrington, E., Son & Co.....	47
Am. Steel Scraper Co.....	84	Burr & Houston Co.....	22	Davol, John & Sons.....	2	Harrington & King Perforating Co..	9
Am. Tool Co.....	64	Bussenius & Cunliffe.....	48	Dayton Malleable Iron Co.....	96	Harris Mfg. Co.....	68
American Tool Works.....	48	Butler, C. N.....	6	Dean Bros. Steam Pump Works.....	32	Harrison Safety Boiler Wks.....	27
Ames Sword Co.....	78	Butterfield & Co.....	40	Decatur Shaft Support Co.....	35	Hart Mfg. Co.....	42
Amidon Tool Corporation.....	64	Butts & Ordway.....	43	De Haven Mfg. Co.....	75	Hartford Steam Boiler Insp. and Ins.	
Ansonia Brass & Copper Co.....	2	Butze, Adolph.....	51	Deltz, A. E.....	74	Co.....	29
Arcade File Works.....	62	Byram & Co.....	25	Deming Co.....	58	Hartley & Graham.....	1
Arcade Malleable Iron Co.....	21	C. & C. Electric Co.....	29	Detrick & Harvey Machine Co.....	45	Haskell, Wm. H. Co.....	88
Armstrong Bros. Tool Co.....	43	Caldwell Mfg. Co.....	76	Detroit Foundry Equipment Co.....	25	Hazard Mfg. Co.....	6
Armstrong Mfg. Co.....	39	California Wire Works.....	6	Diamond Clamp & Flask Co.....	96	Heath, S. F. Cycle Co.....	68
Artificial Gas Engineering Co.....	24	Cambria Iron Co.....	18&26	Diamond State Iron Co.....	96	Heinisch's R. Sons Co.....	65
Athol Machine Co.....	59	Cambridge Iron & Steel Co.....	14	Dienelt & Eisenhardt.....	38	Henderer, A. L.....	37
Atlas Tack Corporation.....	11	Cambridge Roofing Co.....	14	Dietz, Schumacher & Co.....	38	Henderson Bros.....	22
Avery Stamping Co.....	67	Canfield, H. O.....	34	Dille & McGuire Mfg. Co.....	86	Hendey Machine Co.....	54
Ayer, H. C. & Gleason Co.....	35	Canton Saw Co.....	69	Disston, Henry & Sons.....	61	Hendricks Bros.....	2
Babcock & Wilcox Co.....	31	Capewell Horse Nail Co.....	30	Dixon, Jos., Crucible Co.....	34	Hendrick Mfg. Co., Ltd.....	7
Baeder, Adamson & Co.....	56	Carbon Steel Co.....	19	Dodd, A. W. & Co.....	95	Hendryx, A. B. Co.....	3
Banker & White.....	63	Carlin's Sons, Thomas.....	48	Dodge Mfg. Co.....	43	Henley, M. C.....	86
Bardsley, J.....	32	Carpenter, J. M. Tap & Die Co.....	95	Donaldson Iron Co.....	22	Herrick, J. A.....	25
Barns, C. K. & Co.....	21	Chadborne & Coldwell Mfg. Co.....	86	Douglas, W. & B.....	58	Hertz, T. & Son.....	3
Barnes, W. F. & John.....	36	Chambers Bros. Co.....	88	Draper Machine Tool Co.....	48	Higginum Hdw. Co.....	70
Barnett, G. & H.....	63	Champion Blower & Forge Co.....	40	Dudgeon, Richard.....	33	Hill, Clarke & Co.....	49
Barnum, E. T.....	9	Champion Iron Co.....	7	Dunbar Bros.....	4	Hobson, F., Seaman & Co.....	17
Bass Foundry & Machine Works.....	27	Chapman Valve Mfg. Co.....	32	Dunham Nut Co.....	87	Hoffman, J. W. & Co.....	16
Bay State Stamping Co.....	46	Chatillon, John & Sons.....	72	Dupont Mfg. Co.....	35	Hogan, John L. & Co.....	16
Bellevue Pump Co.....	59	Cheney, S. & Son.....	22	Durant, W. N.....	33	Hoggson & Pettis Mfg. Co.....	40
Bement, Miles & Co.....	37	Chess Bros.....	22	Dwight Slate Machine Co.....	38	Hollands Mfg. Co.....	59
Bemis & Call Hardware & Tool Co.	82	Chester Steel Casting Co.....	23	Eagle Anvil Works.....	62	Holmes & Edwards Silver Co.....	66
Benbow Mfg. Co.....	72	Chicago Fire Arms Co.....	58	Eagle Bicycle Mfg Co.....	95	Hooker-Colville Steam Pump Co.....	49
Berger Bros.....	33	Chicago Spring Butt Co.....	70	East Chicago Foundry Co.....	22	Houston, C. B. & Co.....	16
Berlin Iron Bridge Co.....	10	Chrome Steel Works.....	18	Eccles, Richard.....	77	Howard Iron Works.....	63
Bethlehem Iron Co.....	21	Church, Isaac.....	38	Eddy Electric Mfg. Co.....	29	Howard & Morse.....	7
Bevin Bros. Mfg. Co.....	69	Cincinnati Corrugating Co.....	9	Enterprise Mfg. Co. of Pa.....	71	Howson & Howson.....	6
Bickford Drill & Tool Co.....	44	Claffen Mfg. Co.....	34	Erie Engine Works.....	28	Hudson, C. E. & Co.....	71
Bicycle Step Ladder Co.....	74	Clapp, E. D. Mfg. Co.....	77	Estey, W. S.....	6	Hurlbut-Rogers Mch. Co.....	41
Bigelow, C. R.....	49	Clapp, Geo. M.....	42	Ette & Henger Mfg. Co.....	85	Hutchinson, F. S. Co.....	64
Bignall & Keeler Mfg. Co.....	37	Clark, G. P.....	85	Etting, Edw. J.....	16	Ideal Machine Works.....	46
Billings & Spencer Co.....	82	Clark & Cowles.....	5	Eureka Cast Steel Co.....	96	Ideal Mfg. Co.....	68
Bingham, W. Co.....	68	Clarke, Thomas.....	60	Evans-Friction Cone Co.....	3	Independent Electric Co.....	68
Birmingham Iron Foundry.....	24	Clauss Shear Co.....	67	Eynon-Evans Mfg. Co.....	29	Indiana Wire Fence Co.....	7
Bishop, A. W.....	84	Clement & Dunbar.....	57	F. & N. Mfg. Co.....	86	Ingersoll, R. H. & Bro.....	70
Bissell, E. Son & Co.....	51	Cledenin Bros.....	13	Fairmount Machine Co.....	45	Iowa Farming Tool Co.....	83
Blair Mfg. Co.....	85	Cleveland Block Co.....	77	Fay, J. A. & Co.....	43	Ives, H. B. & Co.....	76
Blake & Johnson.....	13	Cleveland City Forge & Iron Co.....	1	Fearing, Wm. S.....	2	Jacobus, W. H.....	88
Bliss Co., E. W.....	35	Cleveland Fence Co.....	6	Ferdinand, L. W. & Co.....	68	Jarecki Mfg. Co.....	39
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Bommer Bros.....	96	Cleveland Stone Co.....	46	Flagg, Stanley G. & Co.....	96	Jenkins & Lingle.....	36
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Mackey, James T.....	43	Phillips, Townsend & Co.....	11	Skinner Chuck Co.....	40	White, A. A. & Co.....	60
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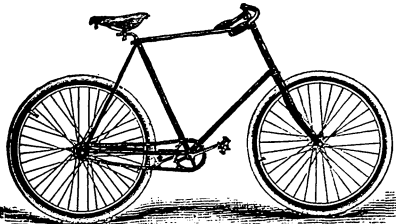
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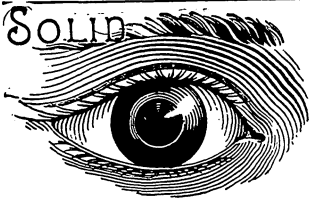
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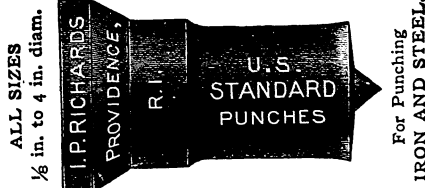


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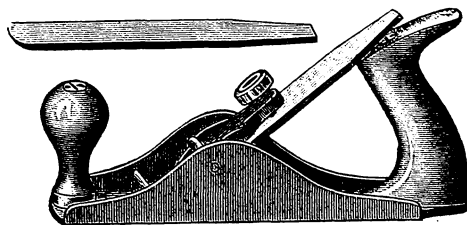
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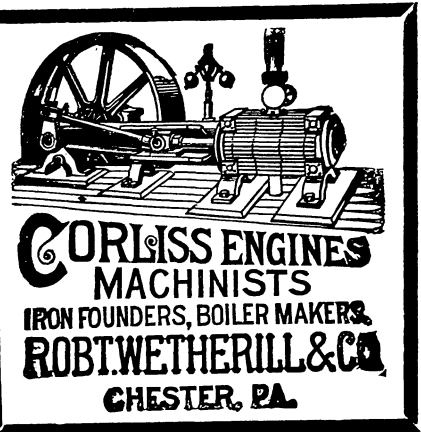
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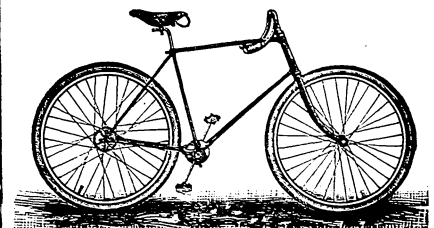


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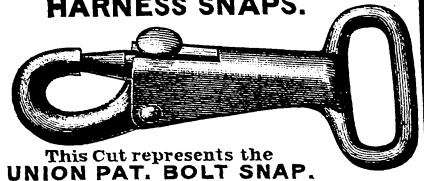


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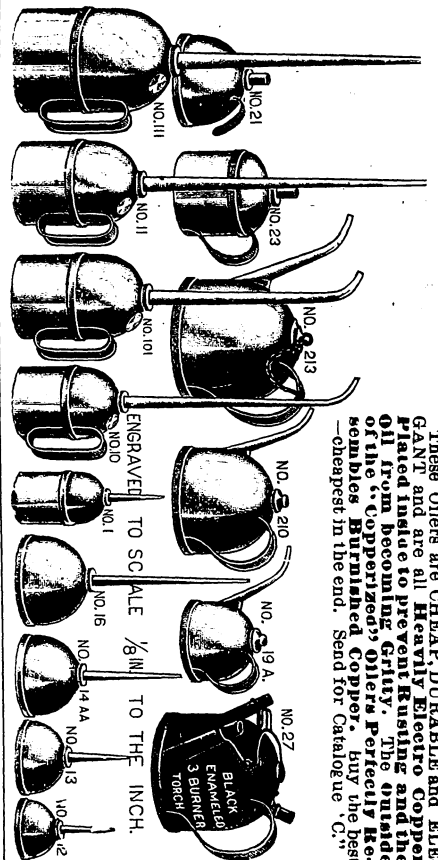
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# THE IRON AGE

THURSDAY, MAY 24, 1894.

## Double Head Horizontal Boring Machine.

While, strictly speaking, horizontal boring machine is the name for an entire class of machine tools, the custom has grown to give it to those machines in particular wherein the boring bar is free to move backward and forward within a cast iron sleeve, by which the bar is driven and with which it revolves. The quick and easy control of the boring bar, the means for rapid and accurate setting of the work, the little percentage of wasted power and the rigidity with which the work is held are all merits which have brought this type of boring machine into general favor and use.

The machine which we illustrate is designed to perform the functions of a horizontal boring machine upon oppo-

sites of the work. These heads contain several sets of tools, each set being fastened to a tube, and the tubes sliding one within the other like a telescope and passing out through the hollow bar to a frame shown on the rack. These tubes are worked from the front of the machine by rods and handles which were not photographed.

The boring bars have a quick and slow hand motion, as well as reversible power feeds. The power feed is an improved friction disk feed, novel in its details. It will be noticed that the various handles for working the table, carriage and boring bar are brought within convenient distance of the workman and close to the work.

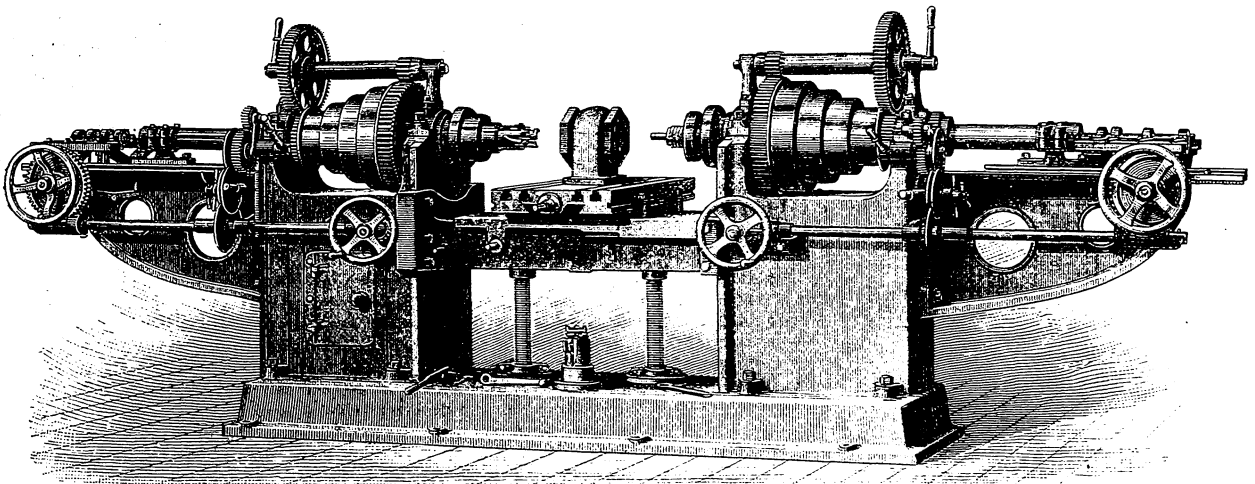
By using cutter heads with fixed tools and by adding a revolving platen to the carriage a simple and efficient arrangement would be secured for boring radial as well as parallel holes.

pany own three blast furnaces and three foundries, as well as extensive mineral and coal fields. They now intend laying down finished iron works to supply railway material to the Indian Government, and Mr. Hudson has been chosen to supervise and establish the projected extensions.

## A Canadian on American Tin Plate.

The *Canadian Manufacturer* of Toronto prints the following:

A few weeks ago the manager of a Toronto manufacturing concern, who are, perhaps, the largest consumers in Canada of tin plates, expressed a wish to have an opportunity of examining and testing some of the finer qualities of American tin plates. The gentleman to whom this wish was expressed hap-



DOUBLE HEAD HORIZONTAL BORING MACHINE.

site sides of the work, at the same time if desired. It consists of two complete heads, bolted to a heavy bed plate and facing each other, a table with vertical movements being placed between them. This table is borne by two screws and it is guided by the V surfaces on the front of the left hand head. When the table is finally set ready for use it is bolted fast to both heads, making an extremely rigid bed for the work. The table is provided with a compound carriage to which the work is bolted, having horizontal movements lengthwise and crosswise of the table. The carriage is novel in design and should possess great rigidity when the work is under the cut, because, in addition to being gibbed in the center to the saddle, it is held on the outside by four heavy gibs or washers, one under each of the saddle nuts. On tightening the nuts the carriage, saddle and table are bolted together hard and fast.

In the present instance, the machine was built to bore, face and tap double gate valves from both sides at one setting. The two steel boring bars, 4 inches in diameter, have a thread cut on the working end, with a heavy flange, against which the expansion cutter head is forced when secured on the bar. One of these cutter heads is shown on the bar; the other is to be seen under

The machine, which was built by the Newark Machine Tool Works, Newark, N. J., for the Burrill Mfg. Company of Havemeyer Building, New York, weighs about 20,000 pounds.

Speaking recently at a meeting in Newcastle, England, Sir Robert Ball, the Astronomer Royal for Ireland, hinted at the approach of a time when posterity might construct machinery that would be operated with heat obtained by the direct action of the sun's rays. He showed on a screen a machine which, by means of a reflector, heated the water in a boiler large enough to generate the steam required to work a small printing press. The machine was one that was exhibited at the Paris Exposition.

By the invention of an Italian seismologist an earthquake shock is made to light an electric lamp for a quarter of a second, causing the face of a chronometer to be photographed, thus registering the precise time of the shock.

W. J. Hudson, a well-known blast furnace manager of the North of England, has been appointed manager of the iron works of the Bengal Iron & Steel Company, at Burrukur, India. This com-

pany opened to be a personal friend of one of the officers of the New Castle Steel & Tin Plate Company, who are proprietors of extensive tin plate works at New Castle, Pa., and in this way the wish of the Canadian consumer was made known to the American manufacturer. It was then that the New Castle Steel & Tin Plate Company addressed a letter to the Kemp Mfg. Company, Toronto, in which it was stated: "We have this day sent you a box of mixed plates—some ordinary coke, some sheets of a better grade of coke, and some of common charcoal. We would be pleased to have you inspect these plates and submit them to any test that you may require in your work. These are genuine American plates, made from Lake Superior ores, through our blast furnace, steel plant, and finished throughout in our works. We are furnishing these plates to some of the largest consumers in the United States, and thus far they seem to give the best satisfaction, as we have received nothing but praise in regard to the coating and working properties of the steel. We make both a pure palm oil plate and a patent plate. The charcoal plates sent you are a pure palm oil finished plate. The cokes are made on patent machines. We are anxious to have you try our



plates, and if at any time you desire high grade plates we would be pleased to quote you prices."

The writer was afforded an opportunity to inspect these American plates and was impressed with the most favorable comparison they bore to similar Welsh plates; and we have been informed by the Kemp Mfg. Company that they have been subjected to precisely the same processes of manufacture in their works as all other plates are, and that they are the equal in all respects of any plates ever used in that factory.

## Western Foundrymen's Association.

The annual meeting of the Western Foundrymen's Association was held Wednesday evening, May 16, at the office of the president in the Western Union Building, Chicago.

J. M. Sweeney occupied the chair in the absence of President Sargent, who was unable to attend on account of ill health. A large number of the members were in attendance.

An interesting report by the president was read, in which he dwelt upon the benefits realized from the work of the association, and referred in complimentary terms to the excellent service rendered by the secretary.

The treasurer, A. L. Patch, reported the receipts of the year at \$455 and expenditures \$448.14. Bills remaining unpaid amount to \$131.79, but dues, &c., not yet collected foot up a total of \$160, leaving an apparent balance of \$35.07.

The secretary, B. M. Gardner, made a very interesting report relative to the growth of the association and the work accomplished. He recommended that the association discontinue the publication of the records of the monthly meetings in pamphlet form, which gave rise to a discussion as to the policy of continuing it. Mr. Gardner stated that the expense averaged from \$20 to \$25 a meeting; that he had been able to get about \$15 worth of advertising per month, thus leaving a margin of from \$5 to \$10 a month expense. The fact developed in the course of the discussion that a strong sentiment existed in favor of continuing to publish the proceedings in pamphlet form, and the subject was then referred to the Executive Committee, who have power to act.

A resolution was adopted that in view of the valuable services which the secretary has rendered gratuitously during the past year the association tender him thanks and a hearty appreciation of the work that has been done.

The chair appointed Messrs. Cope, F. W. Sargent, Vrooman, Penton and White as a Nominating Committee to prepare a list of officers for the ensuing year.

The Nominating Committee reported the following gentlemen as nominees for the various offices: President, Geo. M. Sargent; vice-president, C. A. Sercomb; secretary, B. M. Gardner; treasurer, H. S. Vrooman. Executive Committee: J. M. Sweeney, W. N. Moore, O. T. S. antial, E. C. Greenlee, H. L. Hollis.

No other nominations were made, and the gentlemen named were elected to the respective offices.

In the absence of the president, C. A. Sercomb, the vice-president, was conducted to the chair, and in a brief speech acknowledged the honor conferred on him.

The names of the following gentlemen and firms were presented for membership and unanimously accepted: F. B. Whitcomb, Englewood, Ill.; Backman, Forsyth & Co., Chicago; Rockford Foundry Company, Rockford, Ill.; Pickands, Brown & Co., Chicago; Gardner, Campbell & Son, Milwaukee, Wis.; R. D. Gray, Chicago.

The secretary read the following letter from F. B. Whitcomb:

### The Upper Tuyeres in a Cupola.

I would like to ask you what benefit are the upper tuyeres in a cupola in making iron? I have put in a number of cupolas in different places, and in my experience have found that the larger the tuyeres, or the more surface given them, the better are the results. One that I put in, in particular, was a 40-inch cupola, with four tuyeres 3 by 9, the longest way horizontally, without upper tuyeres. I ran this cupola for some time, and the average melting for one year was  $11\frac{1}{2}$  to 1, which is the best I ever did for a long time trial. The best single heat in that time was 14 to 1, and the heats varied from 4 to 16 tons, using a No. 6 Sturtevant fan. The average on a 4-ton heat was about 40 minutes; the larger heats 7 tons per hour from the time the blast went on until the bottom was dropped. I do not claim that it is all because of the tuyeres that the best work was done, but partly because of the way the fan was placed and the air conducted into the cupola. My opinion is that the fan should be placed as near the cupola as possible, so as to run the conductor pipe straight with as few creases or elbows as possible. Enlarge the pipe as soon as it leaves the outlet of the fan, so that the air will have more freedom, with less back pressure on the fan.

### Hard Iron.

As to lime hardening iron, I have often heard that it will, but have been unable to find that it does, as far as my experience goes after using it for years. My rule is to use as much as will make the slag run freely. I have found that limestone varies, requiring more of some kinds than it does of others to accomplish the same result. In running heats of the same kind of iron, with or without limestone, I could not discover any difference in the hardness of the iron. I think that water does harden iron. One way to prevent the boiling of iron in a brick lined ladle that is not thoroughly dried is to drill small holes around the lower part and bottom of the ladle, so that the steam from the damp lining will have a chance to escape through the bottom of the ladle, instead of coming up through the iron. I think that wet molds make castings harder than dry ones, especially small ones. I think also that a test bar cast in a dry mold will stand a greater test than one cast in a wet one.

Mr. Moore: In our arrangement our blower is 125 feet from the cupola. We found that with our former arrangement we could get about 16 ounces at the fan, which is the limit of the fan pressure. Being crowded for capacity we ran a 20 inch pipe, having, if I remember correctly, about three times the capacity of the 12-inch pipe, enlarged it immediately after leaving the blower, put in a 6-inch elbow and carried it clear across the buildings until we reached the cupola. Then we put in another 6-inch elbow, carrying it down to the cupola. After making that change we got the pressure at the cupola that we had planned. It was a gain of 4 or 5 ounces. Since that time we have put

in a large cupola. We are still running with our No. 7 blower and getting out good work. I think that with the 12-inch pipe and small elbows we could have done nothing at all.

The effect of wet or dry sand upon the hardness of castings is a subject that is worthy of attention. We make some castings upon which there is a good deal of delicate tool work done. There is a portion of our shop in which, on account of the lack of proper drainage, we cannot maintain the sand as dry as it should be and we cannot make these castings there.

Mr. Sweeney: I have read a great deal about cupola performances and zones, but I have never seen them practically demonstrated yet. I have had a little experience lately with a cupola with two rows of tuyeres and I was told that the cupola did not run as it was expected to, and was not as light on coke because it had too much blast. I want to know to what extent the area of the tuyere affects the blast action of the fan. If I understand the action of the fan—and I suppose Mr. Whitcomb's paper refers to the fan—it is that the pressure on the fan of the blast is made by reason of the fact that the current of air gets speed. If you clap a board over the end of the pipe and shut it up tight and run your fan you won't get any pressure. You must have velocity to your current of air. If it is due to the velocity why should the area of the tuyere affect the pressure on the fan? If there is anything we have learned from this paper it is always to have the blast penetrate to the center. The form of tuyeres, in my judgment, should be such as to insure the penetration of the blast to the center of the cupola as nearly as possible. Therefore it seems radically wrong to introduce a tuyere which flares and is greater at the inside of the lining than at the outside of the lining. I do not believe in a flaring tuyere.

Mr. Moore: Bearing on the subject but not answering it, there are a few more facts in relation to our fan experience. When we were running our fan under a 16-ounce pressure it took all the power we could command to do that. We got along very comfortably when we could reduce the pressure. When we got in our new cupola the pressure was reduced several ounces. A fan can be driven against about a 16 or a 17 ounce pressure. If the end of the blast pipe were closed up completely the fan could be revolved, but it would be working against a pressure. The power required will be in proportion to the volume of air and the pressure. I know in our case, as it is now, we sometimes run the cupola with a 48 or 58 lining, and at other times with a 60 lining. When we are running the 60 lining we are unable to obtain as high a pressure, although we put a small pulley on the fan cover and increase the speed of the fan and our engine takes a greater load, although our pressure is lower.

Mr. Sweeney: In the remarks I made I think I distinguished, or intended to, between the working of the fan which resulted in the pressure and the working which the fan might be doing through friction. When the pipe is stopped I call that friction. It is the air that is being carried around the fan box. In the case which Mr. Moore mentions it is now clear. It requires more power to drive your fan after you have increased its capacity, but had diminished the pressure and increased the volume. In the case which I mentioned, the cupolaman informed me there was too



much pressure. The pressure ought to have been kept where it was, but the volume was reduced about 50 per cent. He said reduce the speed of the fan. The speed of the fan was reduced and the pressure was necessarily reduced. Then I wanted to know how the fan was going to maintain the pressure at half the volume. I got no answer. When the speed of the fan went down the pressure went down.

Mr. Whitcomb: The reason I asked this question is because all modern cupolas have these upper tuyeres. I could never see that they made any point. You have got to carry the fuel up above these tuyeres to get any benefit from them.

Mr. Moore: The theory of these upper tuyeres is that they catch the carbonic oxide gas. I believe in practice they are very seldom used.

Mr. Sweeney: What pressure did you have at the tuyere?

Mr. Whitcomb: I could not tell the pressure because I generally get that when the fan is running without a gauge. We have no gauge that is accurate. There were no upper tuyeres. I have not been able to get as good results from other cupolas that had the upper tuyeres.

Mr. Greenlee: The gentleman who has written this paper has given us some very practical ideas. In our experience we always close the upper tuyere, except in very heavy melts. We are running at the present time 12 tons, and we close the upper tuyere entirely, but when we are melting from 16 to 17 tons both tuyeres are opened. It is my impression that we save coke when we have the upper tuyere closed, as the bed must come above the tuyere. I believe that as far as the shape of the tuyere is concerned, there is not very much difference. We have a tuyere now that is large from the wind chest and slants down from the top. I do not know as that is really any advantage, because when we had those that were straight we had just as good results.

Mr. Moore: It seems to me that this association should have the benefit of a full description of the cupola of which Mr. Whitcomb writes and the manner of charging it.

Mr. Whitcomb: I will furnish you with a blue print.

The secretary then read the following paper by H. L. Hollis:

#### Chemical Differences of Some Russian, German and American Castings.

In the Russian exhibit in the Mining Building at the fair last summer were shown some very remarkable iron castings, which will doubtless be recalled by all who visited this section. These consisted of small medallions, vases and other very light ornamental castings, and also thin castings of considerable size, and among these were semi-spherical kettles from 6 inches to 2 feet in diameter. We obtained some of these castings for the purpose of seeing of what kind of iron they were made. Having analyzed these, we obtained a very intricate ornamental casting made by a well known Eastern manufacturing company, and drillings from small ornamental castings made in Germany. These were analyzed to see how they compared in composition with the Russian castings. The results are given below, and the articles from which the drillings were taken are exhibited for your inspection. Owing to the small quantity of the borings only a few determinations could be made, from

samples Nos. 4323, 4325, 4331 and 4332.

Analysis number.	Description of sample.	Silicon.	Sulphur.	Phosphorus.	Manganese.	Graphitic carbon.	Combined carbon.
4319	Russian cast iron kettle.	0.55	0.022	0.554	0.253	3.02	1.09
4323	Russian cast iron medalion.	0.60	....	0.584	0.287	....	....
4325	Russian ornamental cast iron plate.	0.59	....	0.557	0.450	....	....
4321	American ornamental cast iron plate.	2.90	0.049	0.694	0.544	2.62	0.64
4331	Small German ornamental casting.	2.08	....	0.562	0.480	....	....
4332	Small German ornamental casting.	2.23	....	0.444	....	3.54	0.16

Analyses of 4319 and 4321 revealed only a trace of aluminum.

These analyses, it will be noticed, differ very widely, and what will probably cause the most surprise is the very low silicon of the Russian castings. The explanation of this is that the Russian iron is presumably cold blast charcoal iron. About the American castings the following communication has been received from H. H. Supplee of the Yale & Towne Mfg. Company:

"STAMFORD, CONN., 1894.

"B. M. GARDNER, ESQ.

"The iron from which these plates were made is composed of No. 1 Low Moor, with equal proportion of No. 1 Mary and 20 to 25 per cent. of scrap consisting of sprues from previous castings. The facing on the mold is best plumbago and the pattern is returned or 'printed.' The iron is poured quite hot, the mold being made in No. 0 Albany sand, mixed with old sand and sea coal and ground in the mill. The time required for molding one of these trays is about 30 minutes, being molded singly, although usually a number are poured at a time, as many as 50 having been sometimes run at one heat, as we frequently have occasion to furnish these as examples of our work where we do not care to furnish examples of our hardware.

"The writer had the opportunity of examining the Russian castings closely while at the World's Fair last summer, and among them noted especially some of this identical subject, and it is interesting to note that the foreman of our foundry, an experienced Scotchman, recollects seeing castings from this place in his early youth in Scotland, and has also heard one of his early companions state that he had seen the same pattern used in making iron castings in Odessa, Russia. The original casting owned by this company was brought from the Carron Iron Works, in Scotland, a number of years ago by our president, Henry R. Towne.

"I am of the opinion that the fine work made in Russia is more due to the fine character of the original models than to any especial features connected to the molding or casting—with the exception, of course, that all Russian irons are notably free from impurities, and also that modelers and workmen generally in that country are given unlimited time, almost, in which to execute work of this sort, in marked distinction to the urgent methods of modern business in which castings are made in this country. Notwithstanding these points, however, it is be-

lieved that you will find the comparison of these castings with the Russian ones not greatly to our disadvantage, especially when you recollect that these castings are not in any way different from our ordinary hardware metal work, and that we have never considered this plate as an especially difficult one to cast."

In order that those who have been so energetic in condemning the use of analyses for foundry purposes may not use these analyses as an argument for their side, we would like to say a few words on this matter of the use of analyses for foundry work. In our opinion a great deal of harm has been done by the extreme views of some of the chemists and the "anti-chemists," if we may use the term. The influence of the temperature of the iron, nature of the molding sand, and in fact all of the conditions of a foundry, which may vary, have a controlling influence on the product, and it is admitted by all that the temperature and the rate of cooling are elements which to a large extent control the proportions of combined and graphitic carbon, especially in small castings. But having found a mixture of iron that gives satisfactory results, there is no question but that if the chemical composition of this mixture is radically changed, other conditions remaining as before, the same results cannot be obtained in the castings. Having found the chemical composition of a mixture working satisfactorily, the value of analyses comes from being able then to duplicate this with a certainty, and we do not believe that this is possible without the aid of analyses. In general, a certain chemical formula could be given for iron for a certain purpose, but the foundry manipulations could not be the same in different places, and hence the same results could not be obtained. But in the absence of other data, that is as good as any way of starting experiments to find out the best mixture. But having determined the satisfactory composition for a certain purpose under certain conditions, it will be found that the duplication of results can be most certainly obtained on duplicating the chemical composition of the mixture; and now that nearly all the Northern furnaces, at any rate, are prepared to sell on analysis and stock their iron with this end in view, this method of regulating the mixture is in every way practicable.

The several castings referred to in the paper were on exhibition and examined by the members present.

A paper by Thos. D. West on "Round vs. Square Test Bars and the Utility of Transverse, Tensile, Crushing and Impact Tests for Cast Iron" was reported by the secretary as having been received, but owing to the lateness of the hour it was ordered to be held over for discussion at the June meeting.

The meeting then adjourned.

It is stated that the new Manchester Steam Navigation Company will place upon the Manchester Ship Canal, when it is formally opened, shipping aggregating 400,000 tons of traffic yearly, and that the traffic of the United States, India and the Mediterranean will increase the canal company's revenue by \$600,000 yearly.

After a long series of tests, the German naval authorities have decided that a bluish gray is the color that is least distinguishable when exposed to the rays of the electric light. The coast defense vessels and torpedo boats have been ordered to be coated with paint of this color.

### The Jones Under Feed Mechanical Stoker.

Fraser & Chalmers, Fulton and Union streets, Chicago, are sole builders of the Jones under feed mechanical stoker. This stoker has been before the public but a comparatively short time, yet has gained a promising position in the estimation of those who are seeking economy in fuel consumption and the avoidance of smoke from burning soft coal. It is adapted to the use of many kinds of fuel, but gives particularly good results with screenings or slack. Unlike other mechanical stokers, the mechanism of the Jones stoker is not subject to the action of the fire, but is entirely outside of the furnace, is so simple

fire box indicates the banking of the fuel. A front view or cross section of the furnace, as in Fig. 4, shows how the fuel lies in the furnace while the stoker is in operation.

The body of the fire does not rest on grate bars as with the ordinary furnace, but on a solid plate, so that there is no waste of fine coal by its dropping through. Being operated by forced draft through the side tuyeres, the use of such grate bars is avoided.

The application of the air to the top of the fuel causes the constant formation of a body of burning coke, through which the gases must pass from the fresh fuel beneath, thereby avoiding the production of smoke. By increasing or reducing the air pressure the heat of the fire is regulated at the will

two more stokers are used. They are so built that they can be applied to any style of boiler, whether plain, flue or water tube. Tests made repeatedly by disinterested experts show an economy of 10 to 30 per cent, in the consumption of fuel as compared with hand firing and an important saving as compared with fuel oil.

### Test of Armor Plate.

At the proving ground of the Bethlehem Iron Company last week a severe armor test was carried out under the supervision of Captain Sampson, Chief of the Bureau of Naval Ordnance. A test plate representing the turret armor

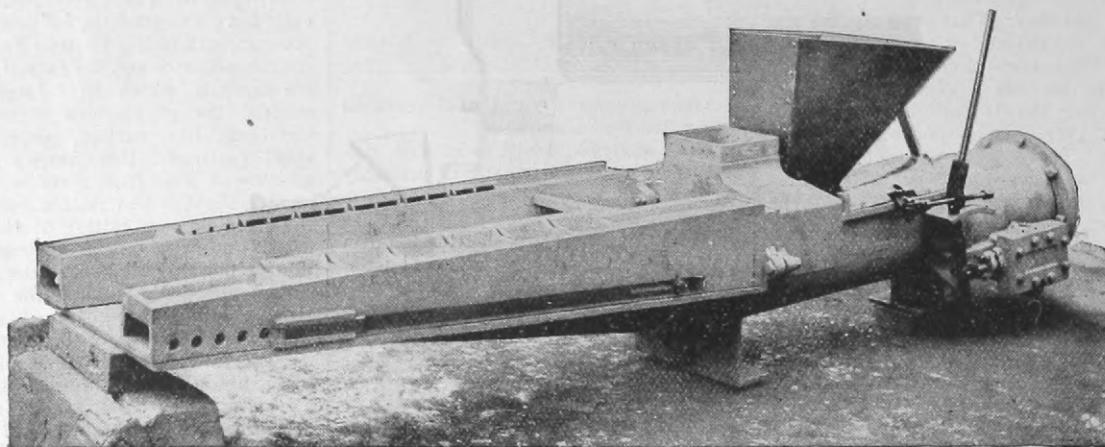


Fig. 1.—The Jones Stoker.

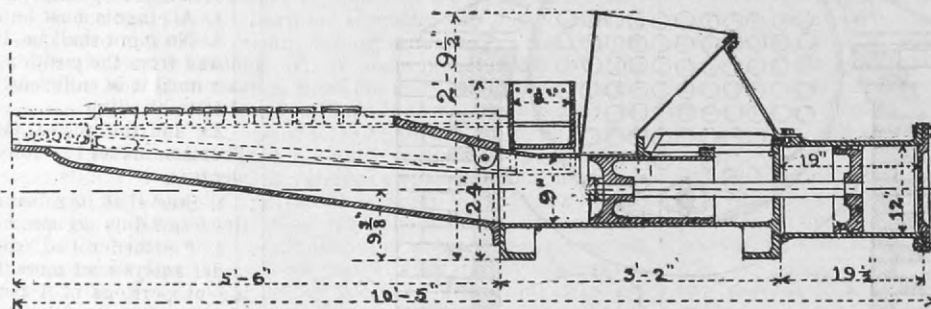


Fig. 2.—Longitudinal Section of Stoker.

### THE JONES UNDER FEED MECHANICAL STOKER.

that it is not liable to get out of order, and its parts can be easily inspected at all times. As shown in Fig. 1, it consists of a steam ram which passes under a fuel hopper and forces the coal up into the body of the furnace under the fire. A fan or blower is used, which forces air through the opening shown back of the hopper, thence passing along both sides of the fire bed and discharging into the burning coal through suitable openings or tuyeres. The stoker extends out on the floor of the furnace room about five feet in front of the boiler. A longitudinal section of the stoker is shown in Fig. 2. This cut gives also the dimensions of the apparatus. It is 10 feet 5 inches in length from end to end of the cast iron construction. The steam cylinder is 12 by 19 inches, and the passage through which the fuel is forced by the ram is 9 inches in diameter. The application of the stoker to a boiler is shown in Fig. 3, in which the dotted line in the

of the firemen to suit the demand for steam. At no time is it necessary to open the feed doors of the furnace, so that the fire can be kept in a uniform condition of high heat, while the supply of fresh coal being always added underneath the fire keeps the top constantly incandescent.

The construction of the bed of the fire box makes it a retort, producing gas from the fresh coal. As combustion takes place only above the air slots or side tuyeres, the castings of the retort are not subject to the action of the fire and are in no danger of burning out. The incoming fresh fuel forces ashes and clinker over the top of the tuyere pipes on to the side grates, whence they can be removed without interfering with the fire in the center of the furnace.

But one sized stoker is made, which will answer for any boiler up to 200 horse-power. If a consumption of over 800 pounds of coal per hour is required

of the "Maine," "Puritan" and "Monadnock" was the object fired at by 6 inch and 8-inch guns. The plate was Harveyized and curved as it would go on the ship, and was 8 inches thick. To cause the acceptance of the armor which it represented it had to receive a blow from a 100 pound 6 inch shot at 1678 foot seconds velocity without cracking, and a blow from another 6 inch shell at a striking velocity of 1978 foot seconds without being penetrated. The penetration by each of the shots was from 2 to 3 inches. As the projectiles were broken and the pieces remained welded in the holes it was impossible to accurately measure the penetration. The plate was not cracked. Captain Sampson then ordered the 8-inch gun to be fired at the plate with 1835 foot seconds velocity. A 250-pound armor piercing projectile was fired, when the plate was cracked, but not penetrated. The tests were regarded as highly satisfactory.

## A Specimen Specification.

George H. Thomson, consulting engineer, New York, formerly bridge engineer of the New York Central & Hudson River Railroad, has issued "Standard Specifications for Structural Steel," which go to greater lengths than any which have yet come to our notice.

merated, provided, however, that three out of five specimens selected at random by him from material rolled from said special cast shall show evidence of piping or lamination.

8. The expense of inspection of the raw materials, the inspection of ingots and the inspection of rolled steel, including the record and identification of the same, together with the cost of chemi-

2. All raw materials shall be subject to the acceptance or rejection of the inspector of raw materials.

5. Rejected raw materials shall not be used in the manufacture of ingots.

Among the clauses relating to the manufacture of the steel are the following:

1. All ingots must be cast from steel melted in an acid lined open hearth furnace.

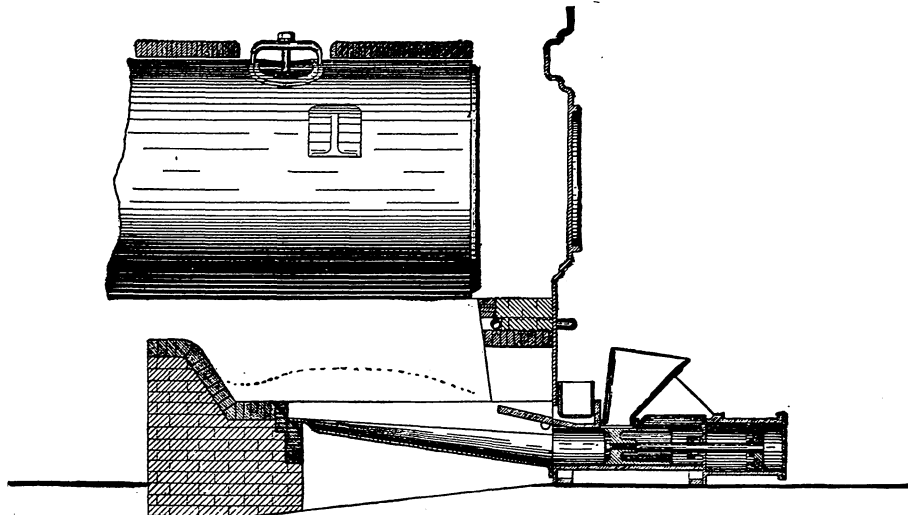


Fig. 3.—The Jones Stoker in Place.

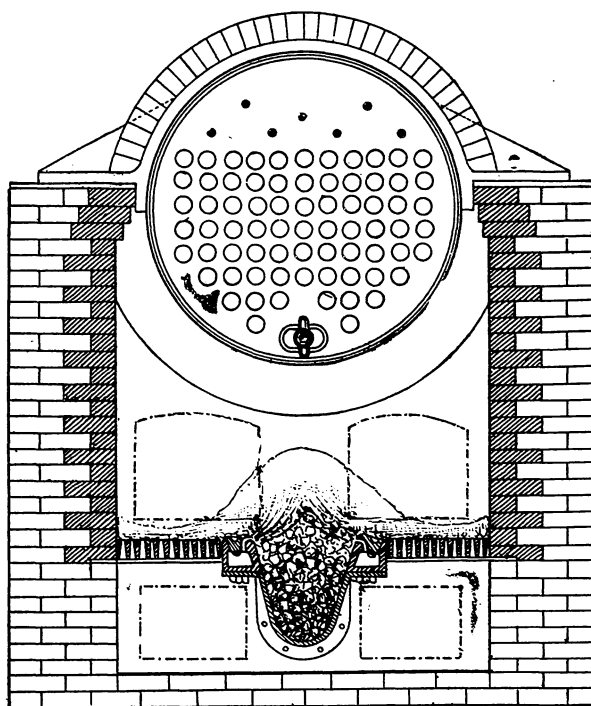


Fig. 4.—Section through Furnace.

## THE JONES UNDER FEED MECHANICAL STOKER.

We quote from them the following paragraphs:

2. The materials used in the manufacture of bridges shall be made from the raw materials to the finished product at one establishment.

3. The finished material shall not be shipped from the rolling mills until the inspector of rolled steel has duly accepted and marked the same.

4. The consulting engineer reserves the right to reject all the steel from any special cast that has passed the requirement of three specifications above enu-

cal and occasional microscopic work, shall be borne by the contractor. The inspectors shall be appointed by the consulting engineer.

9. These specifications throughout are subject to the interpretation of the consulting engineer.

Regarding the raw materials we quote:

1. All raw material used in the manufacture of steel ingots shall be chemically within the Bessemer limit of the following proportions of 1 per cent.: Sulphur, 0.05; phosphorus, 0.10; copper, 0.40.

2. The ingots shall be subject to the acceptance or rejection of the inspector of ingots.

3. No single ingot or casting shall (in order to avoid extreme segregation) exceed 15,000 pounds in weight.

4. All ingots must be bottom cast.

5. No ingot shall be disturbed or removed from the position in which it is cast until it is sufficiently solidified to obviate bleeding.

As for the rolled steel itself, Mr. Thomson makes the following requirements:

1. Steel shall be rolled only from identified and duly accepted ingots.

2. Finished rolled steel shall show under analysis not more than the following proportions of 1 per cent.: Phosphorus, 0.08; sulphur, 0.04; manganese, 0.45; copper, 0.20.

3. All finished rolled steel shall be straight, well finished in the rolling, full to dimensions and free from laminations, buckles, surface, edge or other defects.

4. All finished rolled steel shall possess certain definite physical properties which shall be determined by the inspector of rolled steel from such test pieces (to be prepared by the contractor) as said inspector shall determine, as follows:

	Not less than—	Not more than—
	Pounds per square inch.	
Ultimate tensile strength plates and shapes.....	58,000	65,000
Ultimate tensile strength rivet rod.....	50,000	54,000
Elastic limit plates and shapes.....	38,000	
Elongation plates and shapes under 36 inches wide, 26 per cent. in 8-inch length.		
Elongation plates over 36 inches wide, 24 per cent. in 8-inch length		
Reduction of area plates and shapes, 50 per cent.		
Reduction rivet rod, 60 per cent.		

5. The fractures of test pieces shall be mainly fine grained.

6. Finished rivet rod when heated to a red heat and upset for 3 inches of

metal, shall show (upon cutting out) a silky fracture.

7. Strips of finished material cut along the direction of rolling shall withstand cold bending double upon itself under the hammer without visible cracking.

8. Prepared specimens cut from finished material at random shall show no piping.

### The Use of Water Tube Boilers in the Navy.

(Continued from page 941, May 17.)

#### Discussion.

Dr. Chas. E. Emery: Mr. Chairman, we have reason to be grateful to Mr. McFarland for this very interesting paper. Opening the subject as thoroughly as it does, it is certainly *multum in parvo*.

With the early history of the different boilers of this type I had considerable to do as a consulting engineer for yachtsmen as spoken of in the paper. I had some experience with the Herreshoff boiler of both types, only one of which is mentioned here. The first one was a coil. The next one was a manifold. Some present may have seen a discussion I made on the subject in the transactions of the Society of Naval Engineers, but the incident is worth repeating here to show what care is necessary sometimes in handling novelties. The owner wanted to change from the first type of Herreshoff boiler to the second, because he thought he could get along with one boiler and thereby get his galley in a different place in the vessel. I simply declined to take the responsibility with a new boiler containing crude threads into what were called steel elbows and insisted on the tube boilers, very much to his disgust, but he did not overrule me. The boiler ran through a season. Every time he saw me he was reproaching me. At the end, I think, of the second season he had President Arthur on the vessel and they started from the dock and he was entertaining his guest and his family in the rear, and he became very much vexed with the movement of the boat. They were getting behind slow boats. They finally landed the President, and they assured him that one of the elbows had cracked on one of those boilers, the steam had got up the stack, they had kept the other one in commission and they had said nothing about it. It simply shows there is liable to be difficulty when such things are new.

As regards the Ward boiler, I put one of the early ones in the "Manhattan." The owner had some difficulty; the boiler was not then perfected, but he kept the difficulties from me. The way to overcome the difficulties with that boiler was really studied out in that vessel. The grease from the engine had a very deleterious effect in getting on the joints and overheating them, so that the down take—the central drum—bulged, and it is very possible that there was so much heat at that point that the circulation reversed there and made a local circulation. At any rate, by simply putting fire brick around the drum, which was specified for the next boilers to be built for the revenue service, that difficulty was overcome and then they were very careful about grease.

J. T. Boyd: Several years ago I was engineer at the Atlantic Works and we put in the first Belleville boilers that have been put in in this country. They

were put in the yacht "Shearwater" and the objection then raised was their weight. We had no very good comparison at the time, but these boilers performed very successfully. One winter they went on a cruise to the Caribbean Sea. We are so much interested in the subject in Boston that we are investigating it and probably will undertake the building of Belleville boilers there under the Belleville patents. From our experience, without going into detail at all, we think it possesses qualities that are not possessed by any other multitubular boilers. The experiments made by the Government on the "Shearwater" were made to test the rapid evaporating efficiency with 100 pounds of steam only. The Belleville system is to carry from 200 to 250 pounds and then through a reducing valve to reduce the pressure in the engine. They are to carry 250 on their boilers and 180 to 200 on the engines.

H. DeB. Parsons: I have had a little experience with water tube boilers, especially in yachts. I am a believer in the water tube types, although my remarks would probably appear as if the water tube type was not the best. Yacht boiler service is probably the hardest for boilers of any marine service. The consequence is that the boilers usually in a yacht of the water tube type do not last more than two years. At the end of the second year some trouble is developed. I had a yacht that had a water tube type boiler of the Herreshoff pattern. It was not the old fashioned Herreshoff, fed at the top, but it was the boiler they got out immediately after that, the first of their type fed at the bottom. The boiler lasted about two years and the third summer was replaced with a boiler of another design. That boiler was absolutely worthless. I condemned it on the ground that it was too small for the engine. The boiler designer had so much confidence in his boiler that he stretched the point of horse-power per square foot of grate. The yacht was supposed to run with forced draft and I took it over the four-hour trial trip as specified, and nothing was ever seen of the water. I trusted to the Worthington duplex feed pump and to the engineer's experience, who had been with the yacht about three years, as to the speed the pump could run at, and we let the pump go at that speed, every now and then feeling a little cock on the pump to see if it was pumping water. The engine, apparently, was taking steam all right and exhausting all right. In about three or four minutes after the engine was stopped, the water came back and stood about an inch above the bottom of the glass gauge. During the four hours it was absolutely out of sight, never came back at all. The boiler was condemned. I advised the owner to go back to put in a new type of Herreshoff boiler, the one with the manifold. At my request they made the grate larger than for the size of the boiler to fit the space in the boat. We got about 25 per cent. more grate surface than we had before. The boat was taken on her trial trip and we could not get the water line to vary, and we had plenty of steam and the boiler has worked well. She has been in the yacht now over two years and I have had no complaints from her. In another case a yacht was furnished with a Ward boiler which wore out in about three or four years. I was retained, and the owner put in four boilers in place of the one large Ward boiler, of the Roberts type, against my wishes. The grate surface was increased from

about 56 to 64 square feet, with four boilers. Result: The fire room was so hot you could not stay in it, and as the boilers backed up against the engine room you could not stay in the engine room. The boilers were put on the dock and replaced with the old Scotch boiler which I recommended originally. Although the grate surface is only 50 square feet, the Scotch boiler gave plenty of steam to run the engine. The result of my experience from these cases and others is this: If you are going to use a water tube type of boiler you have got to have plenty of grate surface. They need more grate surface than the other type. I know they will stand forcing, according to the tests, but my experience does not indicate that they will give in ordinary practice the horse-power per square foot of grate that you can get out of the old fashioned boiler. The reason of that is probably that there is no storage of steam, no steam space, and no energy stored in hot water, and the consequence is when the steam once gets down you cannot build it up very well; the engine will take it faster than it makes, unless you have boilers of ample size.

J. C. Kafer: The design of water tube boilers has been to make steam on very little weight. The problem now is to get maximum power from minimum weight, and that is the problem for the water tube boiler. If you have a water tube boiler with sufficient grate surface, that alone will not accomplish the result. You must burn coal at a maximum rate of combustion, and if you burn 50 pounds per square foot of grate surface in a Scotch boiler you certainly have a very much lighter boiler than if you burn 110 pounds per square foot of grate in a tubular boiler. If a designer were to select any particular type of water tube boiler he would probably meet with bad results in one way or another. You must take whatever you have and make the best of it. The great difficulty in the water tube boiler is to get it perfectly accessible. With tubes readily removable repairs can be easily made; and it should be made to last a reasonable length of time—not to last the length of time that a Scotch boiler will last. I do not know of any one boiler in the market that will fulfill all the conditions and yet have maximum power for minimum weight. The great difficulty with designers has been to crowd too many small tubes in the space allotted to them, and for that reason they want to get rid of the weight of water. That is the chief advantage of the water tube boiler having small tubes. The Belleville is a very excellent boiler to operate under natural draft. But if you will take a box coil and have a hot fire under the lower coil and burn 50 pounds of coal per square foot of grate you will find trouble before you get up to the upper end. That is one reason why a Belleville boiler will weigh more than a Scotch boiler, or nearly as much as a Scotch boiler of the same relative horse-power under forced draft. The Belleville boiler must be operated at a lower rate of combustion than that at which the Scotch boiler can operate with perfect safety. With reference to the other types of boilers—Yarrow and Thornycroft and others—they all depend on the natural circulation due to the less weight of water. It is well known, I think, that a boiler of that type will hardly evaporate as much water per pound of coal under ordinary conditions as the ordinary Scotch boiler. But if you could have an engine on the outside and force the water through the



tubes so that you knew when the shaft was coming that the water was going through the tubes you would accomplish perfect circulation, and yet you might have the tubes in such a position as not to have corrosion when the vessel was laid up.

Mr. Isherwood: The vital defect of the water tube boiler, one which has been very little alluded to heretofore, if known at all, is that it is impossible to obtain with it the same economic evaporation that you can obtain with the ordinary shell boiler. That is to say, if you make the two boilers, the pipe boiler and the shell boiler, both with the same grate furnace and the same heating surface and burn the same quantity of coal in both per unit of time, it will be found that the pipe boiler gives about 10 per cent. less economic evaporation. This is due to the air leakage in the case of the water tube boiler. In the case of the shell boiler no exterior air can get mingled with the gases of combustion. The only air that enters is what enters through the furnace in the ash pit and over the bed of coal on the grate through the holes in the furnace door. Every particle of air that enters into and mingles with the gases of combustion after they have passed over the bridge wall reduces the economic evaporation of the boiler very largely. In the first place it cools these gases so that they do not have the temperature upon their heating surface, consequently cannot give the evaporation, and in the second place it requires a certain quantity of heat to force those gases out against the resistance of the atmosphere, the opposing resistance at the top of the chimney, which also is at the expense of the heat of the coal. The two things put together will make that difference about 10 per cent., as I have stated, of the economic evaporation of the two types of boiler. There is no practical way of excluding the air leakage, and while I am on this subject I will say that there is just the same difference of 10 per cent. in boilers set in brick work. There percolates through the brick work setting a certain quantity of air, very much larger than any one would suspect, and that reduces the economy of the evaporation. In the early days of my practice as an engineer I was confronted with the fact that all the boilers set in brick masonry gave a lower economic evaporation than those not so set. In other words, that the interior fired boiler gave a higher evaporation than the exterior fired boiler. I made quite a table of the results from all the boilers of the two types that I could obtain. A very great many of those experiments were made by me, and I took the mean of them and I found that they approached 10 per cent. very closely. I did not at that time know the reason. I could not see why this difference should be for a long while. But the difference was there as a practical fact, and it was caused, as I afterward ascertained, by the inleakage of air into the gases of combustion cooling them and requiring more expenditure of heat to expel them from the chimney. In a ship a difference of 10 per cent. in the evaporation of the boiler means a good deal more than what appears on the surface. To develop the same power for the same length of time you have got to carry 10 per cent. more coal in your bunkers. That difference of 10 per cent. of course becomes more important as you carry more and more coal and make longer and longer voyages. It goes very far to counterbal-

ance the saving of weight with the water tube boiler. Of course upon the land where the weight is of no importance you simply lose your 10 per cent. of fuel. Now in addition to this inleakage of air, the radiation from the water tube boiler is very much greater than from the shell boiler. In the case of the shell boiler the temperature is that of the water inside of the boiler; that is, the temperature which is on one side of the shell, the atmospheric temperature being upon the other. In the case of a water tube boiler the temperature of the gases of combustion is upon one side of the shell or casing and the same temperature of the atmosphere on the other. The radiant heat in a vessel with a water tube boiler is intense compared with the radiant heat from the ordinary shell boiler. Those are facts that have to be met and we have to account for them in designing boilers. For small vessels, launches, torpedo boats and that class of vessels, you have generally but one boiler and you have plenty of air circulation around it, where it can be kept clean and well cared for. If any repairs are to be made it can be hoisted out by a few men on the dock and put back again. But it is a very different thing when you put an enormous power into a vessel and boilers of this type. As a general rule they will probably last under ordinary circumstances of sea practice from two to three years. It is difficult to understand that they can last longer than that. I am aware that some boilers, like the "Cushing's" and a few others, have lasted much longer, but why? They have been protected by zinc. Large quantities of zinc have been put into them according to the practice of the Thornycroft people and others building those boilers. That answers very well. But it is very expensive. The simple question is, Will you pay in zinc or will you pay in boiler? In the case of a water tube boiler with its thin outside casing of sheet iron, apart from the great loss of heat by radiation there comes the difficulty of repairing. Any person who has examined those boilers and has seen the wilderness of small tubes in them, the impossibility of getting at any one of them or at their joints, will see that to repair one of those boilers you have got to lift it out as a general rule. You cannot find the place. It may happen to be a double tube or an inside tube and you can see it, but if it is any of the interior tubes that leaks it is impossible to tell. Now, in the case of a vessel, that is a very serious piece of business—to have your boilers break down all at once at sea. What is required is durability. In the case of the ordinary Scotch boiler, in which iron tubes or steel tubes will last from two to three years, you can always see when your tubes are going. It is only a matter of eyesight and they are easily replaced. Of course, these are facts which will probably develop as these boilers come more and more into use, and I have no doubt they will come into use, but not permanently. I have very great doubts of that for anything like seagoing vessels. The tubes of an ordinary tubular shell boiler will last from two to three years and there is no imaginable reason why they should last any longer in the water tube boiler, if as long. The old Martin boilers which we had in the navy had vertical water tubes placed in the tube box. When those tubes were made of iron the lower 6 to 9 inches began to rust out in less than a year. You had to commence

renewal at about that time and continue it constantly until they were all renewed. The upper part of the tube was not touched. They were as good as new. The lower part was entirely gone. Now why was it? Simply this: The lower portion of the tubes was in ashes, the ashes from the coal deposited in that, and every time boilers were banked down there was a deposit of moisture on the surface of the tubes, which trickled down into this ash and made a very corrosive lye, an alkaline solution, which corroded the tubes very rapidly. Now why should not this result take place in, we will say, the Thornycroft boilers, in which the lower parts of the tubes are vertical? They are inaccessible for cleaning; the ash and soot must collect and they must be damp at times, and there must be the same alkaline solution there that there was in the Martin boiler, only much more so, and why should it not produce the same effect of eating out the tubes? With regard to the Belleville boiler, that was first used in the French Navy as far back as the days of Napoleon III. Its use commenced then. It was put, I think, in some half dozen vessels, and I do not know that type of boiler has been modified at all since. That which was put in the "Shearwater" was exactly the same as used in the earlier French vessels and every one of them was taken out. A number of years ago I was in France and visited every French dockyard, and I conversed very freely with the French engineers stationed there. Their opinions to a man were against that type of boiler. They were all removed from the vessels, since that they have been reintroduced, and with what success it is impossible for me to say, because the most instructive of such trials rarely ever reach the world. We hear all about the successes, but we hear nothing of the failures. Nevertheless I think that the navy should make large experiments on this type of boiler, build one of that type, try it thoroughly, stop at no expense on it, because the subject is well worthy the cost. But thus far we have not had any such experiments, not complete enough or extensive enough to enable us to form a real opinion upon it. As regards the forcing of the water tube type of boiler, it can be forced to any extent, from the simple fact that the tubes are curved so that any difference of expansion does not injure the joints, but the tube merely curves more or straightens more, and the joint remains unaffected, nor is the tube at all injured. In the vertical Scotch boiler we have a straight, rigid tube, and whenever the temperature of that tube becomes much greater than the temperature of the water which surrounds it, it is sure to expand and force the tube ends through the tube plates. That has always been the result when the attempt is made to force combustion in a vertical Scotch boiler beyond 46 or 47 pounds of coal per square foot of grate per hour. That is the maximum combustion that is possible with it. In the British Navy the attempt was made to go beyond that, and, as all the world knows, it was a failure. The boilers leaked a deluge the moment that rate of combustion was passed. Then it was stated that by means of a species of ferrules they succeeded in overcoming that difficulty. That was one of the little romances that are sometimes used to cover a failure. The truth is the so-called ferrules did no good whatever, and the proof of it was the fact that they were obliged to lessen the rate of combustion down to a point somewhere

in the neighborhood of 40 to 45 pounds, which is now the maximum and at which those boilers are perfectly safe, but not above that.

Eckley B. Coxe: I wanted to ask whether anybody knows what effect the increasing or decreasing the amount of coal consumed per square foot of grate surface, or the burning of coal, has on the relation of the temperature of escaping gases, and, secondly, upon the relation of the carbonic oxide and the free oxygen. From experiments I have made lately I am satisfied that a great many of the wonderful divergences that are found in experiments on boilers are due to the fact that that relation between the free oxygen and the carbonic acid and carbonic oxide varies very considerably. I have recently in an experiment had as high as 15 per cent. carbonic acid and no carbonic oxide. I have also had as much as about 9 per cent. carbonic acid and 8 per cent. of free oxygen and still nearly 2 per cent. of carbonic oxide.

Mr. Isherwood: I think I can answer the question in part; that is, the relation of the different gases of combustion depends altogether on the thickness of the bed of coal upon the grate surface. Some particular fireman or some particular watch of firemen do a great deal better than others. They carry the same steam with very much less fuel. They have found out by practice the exact thickness of the bed of coal that gives them the maximum result and they adhere to that.

James McBride: I happen to have in my pocket the analyses of the gases of some boilers that I am running. I find that the amount of carbonic acid gas, carbonic oxide and oxygen can be varied to almost any extent you want by increasing or decreasing the amount of air admitted to the ash pit: Carbonic acid, 15.6; oxygen, 3.3; carbonic oxide, one-tenth of 1 per cent.; the second, 17 carbonic acid; one-half of 1 per cent. of oxygen, and 5.1 of carbonic oxide. Now, in that particular case I did not have oxygen enough admitted to the ash pit, so I gave it more and I immediately brought down the carbonic oxide to one tenth of 1 per cent. This is burning a by-product—logwood chips. It is nearly 50 per cent. water. Here is one of coal: Carbonic acid, 11.48; oxygen, 2.7; carbonic oxide, 1.6. I use the Elliott gas testing apparatus and I make analyses of the gases every few days. I find when the boilers are not making steam as they ought, by an analysis of the gases, a large amount of carbonic oxide going to loss and not sufficient oxygen. I can regulate it very nicely by increasing or decreasing the amount of fuel burned and by regulating the air.

Mr. Forney: I should like to inquire if any one present has any data with reference to the water capacity of water tube boilers in proportion to the quantity of fuel consumed. It has seemed to me from the general drift of the papers on this subject that some difficulty in the operation of water tube boilers was experienced from the fact that the water capacity of the boiler was so extremely small in proportion to the old fashioned shell boiler.

D. Almy: I would say in regard to the weight of water in a water tube boiler that has been in use some three years, that the weight of water is about  $1\frac{1}{4}$  pounds per square foot of heating surface. This boiler develops 272 indicated horse power on  $3\frac{1}{4}$  inches air pressure and weighs about  $5\frac{1}{2}$  tons. Now, there is trouble to maintain the water in that and carry a steady steam

pressure. It runs with about 225 pounds steam pressure. It has been run 250. I have one boiler that I built four and one-half years ago that weighed 6500 pounds that had 1400 pounds of water. That has run about 75,000 miles, developing 140 indicated horse-power, and it shows an economy over a tubular boiler of 13 per cent. In regard to the heat of the outside casing, the temperature is about 120°.

Professor Hutton: For the credit of my old friend and colleague, Professor Trowbridge, I should like to refer in this discussion of water tube boilers to a boiler which he designed and which was experimented with at some time at New Haven and which, I think, deserved a better fate than it has received. Professor Trowbridge's coil boiler was a spiral coil built very much upon the design of a base burning stove. The hopper, which was intended to be a magazine feed for the boiler, came down in the middle and this coil of pipe surrounded it. But the special feature of interest in that boiler was the forced circulation to which reference has been made. The feed pump of the boiler was not only a feed pump, but a circulating pump, so that the water which was to be evaporated was kept continuously circulated in the evaporating coil and was delivered from the top of that coil into a little bit of steam space, from which the engine took its supply. As a result of the design and that feature of forced circulation a little boiler which you could cover with a flour barrel was competent to run a 40-foot launch and they got a surprising amount of efficiency from it, without so much reference to economy. But the quantity of steam that little machine would make was surprising. Professor Richards of Sheffield made an elaborate investigation of it. It was the aim to supply the demand for a boiler which should be practically self managing; that would require no more attention from anybody than a base burning stove. You filled it in the morning and you filled a magazine of water, and it was to be self feeding and keep its level constant until somebody thought of looking at it again, with the idea that in printing offices and other places in the country such a thing would be useful. Financial and other reasons prevented the thing from getting the opportunity that I would have been glad to see for it. But the device showed the principle of forced circulation in a coil boiler of that type.

Mr. Mosher: Having had some little experience with water tube boilers I think I can point out a few matters that have not seemed to receive a fair amount of attention. The bad reputation that a great many water tube boilers have is due to their not being adapted to the work intended. In a boiler, the first place to look is in the fire. The amount of coal that can be burned is governed by the draft as well as the cooling effect of the surroundings of that fire, which has some little importance in many cases. If the conditions are such as to admit of perfect or nearly perfect combustion, it matters not what sort of boiler you use provided you supply sufficient heating surface to absorb the heat so that the temperatures admitted to the stack are very low. Now, the amount of draft in many cases is dependent on the temperatures released in the stack, which govern the amount of coal burned and also govern the economy of burning that coal. The absorption of the heat in both types of boilers should be equal in either case providing you have an equal amount of

water covered surface, and the economy should be equal. Now, as regards air leaking in through the casing, that is a question of workmanship purely, and I consider there is no excuse for it. It is an undoubted fact that very few boilers are thoroughly protected—that is, clothed from radiation. In burning from 30 to 50 or 100 pounds of coal per square foot of grate, the boiler must be adapted to the work or else it means failure. Many boilers are driven beyond what they are adapted to. For instance, the Belleville boiler gives very satisfactory results under natural draft. One of the reasons it will not stand forcing is because the tubes have a very small inclination. It is well known that in the Belleville boiler the steam room is less than that of any other make. The management of the fire calls for a very peculiar kind of knowledge, an intuitive knowledge which very few men have, judging from the results. The boiler that has only a very small quantity of water has got to make the steam as fast as it uses it. The fire has got to be handled very lightly, as the steam will come and go as the fire door is opened; whereas with a boiler carrying a large amount of water they can charge the fire very heavily and the result is not affected. One of the reasons why Mr. Belleville has resorted to such large diameter of tubes is the very small incline of his tubes. It is stated that many of our stationary boilers with tubes set at an angle of 15°, when burning 20 pounds of coal per square foot of grate, are able to drive the water out of the top—that is, the lower tube next the fire. In case they want to correct that, it is only necessary to set the tube at a little greater incline and also to provide sufficient circulating water.

As regards the deterioration of the water tube boiler, there seems to be no fair reason why it should deteriorate any quicker than a shell boiler. The tubes in water tube boilers with crooked tubes generally are so arranged that replacing the tubes is a difficult matter, but they may be plugged very handily. In a boiler recently designed I have provided two independent boilers in a single casing, so that in case one side should give out you could continue with the other side. I think on small launches that is quite an important matter, as I have known some that have had accidents on the ocean and very narrow escapes.

*Lloyd's Register*, in its latest returns, shows that excluding war ships there were 411 vessels, of 725,208 gross tonnage, building in the United Kingdom on March 31 last. The particulars of the vessels in question are as follows compared with the corresponding period of 1893:

	March 31, 1894.	March 31, 1893.
Steam:	Gross tons.	Gross tons.
Steel.....	663,801	551,444
Iron.....	3,857	3,469
Wood and composite..	938	378
Totals.....	663,396	553,291
Sail:		
Steel.....	58,132	82,525
Iron.....	645	465
Wood and composite..	3,035	3,387
Totals.....	61,812	86,377

Total steam and sail... 725,208 621,668

The number of steamers under construction exceeds those for the previous quarter, and is the largest for any quarter since March, 1891, while the sailing vessels exhibit a falling off. Steam vessels of an aggregate tonnage amounting to 247,238 were on the books of shipbuilders on March 31, 1894, but had not been commenced.



### The Daniels Steel Railroad Tie.

The Daniels Steel Railroad Tie Company of Youngstown, Ohio, make a new tie which is the invention of Robert E. Daniels, a roll turner of wide experience. The tie is made from old steel rails which are selected, all the culls being discarded. These rails are run at white heat through rolls especially designed for the purpose. Upon coming through the rolls and being sheared to the desired length for street or steam railroads, the tie is plunged into a vat of boiling tar, where it remains for several hours. Taken from this vat it is punched as may be desired to suit the flange of rail to be used upon it.

The form of the tie is clearly shown in Fig. 2. The rail is held to the tie by

sail vessels and barges, 294; unregistered craft, 213. The total amount of freight paid for was \$9,957,483, and the cost per mile  $1\frac{1}{10}$  mills. The average distance freight was carried was  $831\frac{9}{10}$  miles, which was  $9\frac{5}{10}$  miles greater than in 1892.

### Changes in the Canadian Tariff.

The following changes have been made in the Canadian tariff: On all iron and steel bars, rods, strips, or steel sheets of whatever shape, and on all iron or steel bars of irregular shape or section, cold rolled, cold hammered or polished in any way in addition to the ordinary process of hot rolling or hammering, there shall be paid  $\frac{1}{2}$  cent per pound in addition to the rates imposed on the said material.

cents per thousand; exceeding 16 ounces to the thousand,  $1\frac{1}{2}$  cents per pound.

Wrought iron or steel nuts and washers, iron or steel rivets, bolts with or without threads, nut and bolt blanks, less than  $\frac{3}{8}$  inch in diameter, 1 cent per pound and 25 per cent. ad valorem.

Brass and copper nails, rivets and burrs, and manufactures of brass or copper not elsewhere specified, 30 per cent. ad valorem.

Lead pipe and lead shot,  $\frac{4}{10}$  cent per pound and 25 per cent. ad valorem.

Enameled iron or steel ware, including granite or agate ware, 35 per cent. ad valorem.

Telephone and telegraph instruments; telegraph, telephone and electric light cables; electric and galvanic batteries, electric motors and electric apparatus

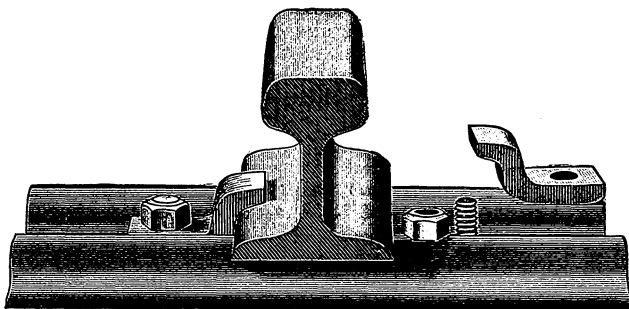


Fig. 1.—One Clamp Removed to Displace Rail.

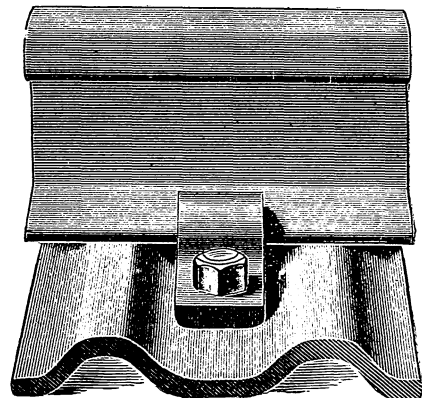


Fig. 2.—End View of Tie.

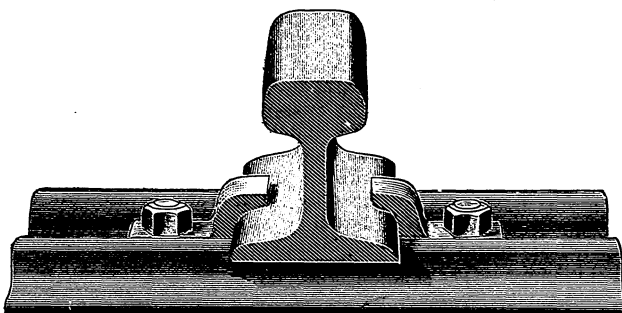


Fig. 3.—Tie with Rail Clamped in Position.

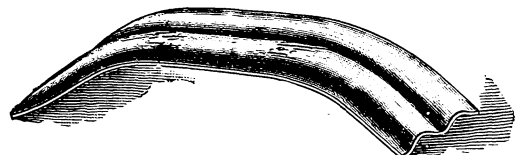


Fig. 4.—Tie Anchor for Use on Curves.

### THE DANIELS STEEL RAILROAD TIE.

clamps as shown in Figs. 1, 2 and 3, and to remove the rail it is only necessary to loosen one of the clamps. The form of the tie anchor for use on curves will be understood from Fig. 4. These ties have been used with the most satisfactory results for over two years in the tracks of the New York, Lake Erie & Western Railroad at Youngstown, Ohio.

In a report sent to the House of Representatives last week by the Secretary of War, Colonel Poe of the Engineer Corps gives some interesting information respecting lake commerce in connection with the report of the operation of the St. Mary's Canal during the year 1893. The canal was open to navigation for 219 days of the year, a decrease of 14 days as compared with 1892. The amount of freight carried during the past season was 10,796,572 tons, a decrease of 417,761 net tons in comparison with the season of 1892. The number of registered craft using the canal during the season was: Steamers, 459;

Forgings of iron and steel of whatever shape or size or in whatever stage of manufacture, not elsewhere specified, 35 per cent. ad valorem, but not less than \$15 per ton.

Rolled iron or steel angles, channels, structural shapes and special sections, weighing less than 35 pounds per lineal yard, not elsewhere specified, 35 per cent. ad valorem, but not less than \$10 per ton.

Iron bridges and structural iron work, 30 per cent. ad valorem, but not less than 1 cent per pound.

Railway fish plates and tie plates, \$10 per ton.

Axles, springs and parts thereof, axle bars and axle blanks of iron or steel for railway or tramway vehicles, \$20 per ton, but not less than 35 per cent.

Axles, springs and parts thereof, axle bars and axle blanks of iron or steel, not elsewhere specified, 1 cent per pound and 20 per cent. ad valorem.

Wire nails, 1 cent per pound.

Cut tacks, brads or sprigs, not exceeding 16 ounces to the thousand,  $1\frac{1}{2}$

not elsewhere specified, 25 per cent. ad valorem.

Chrome steel, 15 per cent. ad valorem.

Copper wire, 15 per cent. ad valorem.

Wire cloth, n.e.s., 30 per cent. ad valorem.

Cases for jewels, watches, silver ware, plated ware, cutlery and other like articles, 5 cents each and 30 per cent. ad valorem.

Wood pulp, 25 per cent. ad valorem.

Emery wheels, 25 per cent. ad valorem.

The successful completion of the Manchester Ship Canal on the west coast of England has induced the trading community of Sheffield to take steps for carrying out the long contemplated plans for a ship canal from their city to the eastern coast. A company has been formed for the purpose, and a bill is now before Parliament authorizing the work of construction.

# The Influence of Varying Temperature on Metals.

BY M. RUDELOFF,

Acting Director of the Royal Prussian Testing Department.

During the year 1892 numerous tests were made at the Royal Prussian Testing Department to ascertain the influence of higher temperatures on the physical qualities of wrought iron, open hearth steel, copper, rolled delta metal, cast delta metal, 4 per cent. and 15 per cent. manganese bronze. The tests were made on account of the German shipyard at Wilhelmshaven. The metals were tested at the ordinary temperature of the room, at 100°, 200°, 300° and 400° C. Three tests were made of each metal at the temperatures given. To eliminate possible slight inequalities in the bars, test pieces were cut off alternately. That is, 1, 6, 11 for one test; 2, 7, 12 for another, and so on. Test pieces were 4 inches long between shoulders and 0.4 inch in diameter. Elongation was measured in 3.543 inches, or 90 mm., and 30 mm. on each side of fracture. Steam was used as heating medium for tests to be made at 100° C., the vapors of naphthaline for the tests at 200° C. and of naphthylamine for those at 300° C. It was found that the test pieces could not be heated to 400° C. with the vapors from these substances. After numerous trials as to the effects of heat of 400° C. in a lead bath on the delta metal and manganese bronze, it was found that these metals would suffer no deterioration during the time of testing, hence a metal bath consisting of an alloy of lead and tin was used, and was found to answer the purpose very well.

Figs. 1, 2 and 3 illustrate the apparatus used for the tests made at 100°, 200° and 300° C. The pipe R was slipped over the lower nut M, into which was screwed the lengthening piece V to reach the cross head of the testing machine. P is the test piece. The pipe R measured 2.8 inches in diameter and extended over the upper nut M<sub>1</sub>. The asbestos packing A<sub>1</sub> was to prevent too rapid radiation of heat. Inside the pipe R were smaller pipes, R<sub>1</sub> and R<sub>2</sub>, open at one end. Their function was to retain the vapors or steam, which entered at L and channel B around the test piece. Escape was provided through channel B<sub>1</sub> and S. Pipes R<sub>1</sub> and R<sub>2</sub> had to be dispensed with when using naphthaline and naphthylamine on account of the rapid condensation of their vapors filling the space under pipe R<sub>2</sub>. The whole was inclosed in an asbestos hood, H, with cap. O. Thermometer was inserted at E.

The elongation was measured in the following manner: Both ends of test pieces were drilled into as far as J and J<sub>1</sub>. Small rods S and S<sub>1</sub> rested at the bottom of these holes and were held there by the springs f. The lower one of these rods carried the cross piece a (Figs. 1 and 3), into which the siderods t were fastened. The rods t were held in position by the ring r and the upper ring b. Bar e extended across the ring b, which had a threaded "boss" or projection in the middle over which nut e was screwed. In a recess of this nut e rested a hardened steel ring, g, with its upper surface polished and extending 1 mm. above the top of rod S<sub>1</sub>. Steel piece h was provided with two points on its under side, one of these points resting on the polished surface of ring g and the other point on

the polished top of rod S<sub>1</sub>. Steel piece h carried on its upper surface the lever l, which rested with its knife edge in stir-

stretch of the test piece downward was transmitted to the pointed steel piece h through the rod S to cross bar a and

Table I.

Kind of metal.	Temperature.	Modulus of elasticity.	Limit of proportionality	Limit of stretch.	Breaking load.	Elongation. Per cent.		Contraction of area.
	Degrees centigrade.	Pounds per square inch.	Pounds per square inch.	Pounds per square inch.	Pounds per square inch.	In 30 mm.	In 90 mm.	Per cent.
Wrought iron.	14.6	29,516,875	25,462	28,876	50,214	35.3	30.3	55.0
	96	29,203,925	27,454	29,010	55,193	19.0	16.1	47.9
	218	26,660,437	14,225	19,346	67,284	20.0	17.7	45.7
	292	26,870,175	7,397	18,492	68,849	34.4	29.9	49.3
	400	21,337,500	6,400	18,927	45,800	49.6	40.2	53.3
Open hearth steel.	15	29,303,500	37,558	38,836	63,728	34.4	30.2	59.6
	96	30,157,000	33,570	38,460	66,288	19.3	16.8	51.1
	216	29,730,250	27,728	34,000	79,375	19.3	17.3	40.8
	306	26,927,925	18,360	23,929	75,250	33.6	30.1	55.4
	393	24,040,250	9,673	18,919	58,464	31.6	28.6	30.8
Copper.	16.6	17,070,000	4,836	38,265	41,395	17.9	14.9	54.6
	96	14,104,175	5,974	38,273	39,261	11.8	8.2	56.4
	218	15,734,400	10,242	30,863	34,566	10.9	7.8	52.4
	297	.....	.....	21,337	29,558	13.5	10.7	43.3
	393	.....	.....	11,522	20,341	8.5	6.7	9.8
Delta metal (rolled).	15.8	12,552,562	12,660	21,000	60,740	41.5	39.2	37.5
	96	12,404,200	17,494	23,613	54,188	45.7	42.9	37.6
	217	10,234,887	10,511	23,044	43,528	69.0	62.2	55.5
	285	.....	.....	15,789	30,300	65.6	48.6	56.4
	400	.....	.....	1,849	9,673	61.6	72.2	65.3
Delta metal (cast).	.....	13,912,050	6,684	13,796	46,790	21.9	21.2	24.8
	97	14,367,250	9,104	13,370	46,400	27.6	26.9	24.2
	218	12,838,062	10,811	14,358	38,400	29.3	28.3	29.3
	291	10,498,000	5,974	11,000	28,896	55.2	55.6	43.9
	393	.....	.....	3,413	8,960	32.2	29.7	24.8
4 per cent. manganese bronze.	15.4	16,927,750	3,700	19,346	41,394	40.7	37.6	67.7
	96	17,070,000	4,836	16,927	37,930	38.2	33.5	69.7
	218	16,354,750	12,660	16,358	36,482	37.9	33.4	65.6
	290	19,634,750	7,254	17,000	36,842	37.0	33.8	56.5
	378	12,731,375	5,832	13,656	29,800	15.8	15.3	20.2
15 per cent. manganese bronze.	.....	13,371,500	10,930	19,915	50,783	34.3	30.9	43.7
	96	12,980,312	12,660	19,913	47,000	27.1	25.7	34.9
	218	13,150,459	11,800	19,000	49,218	34.5	32.0	42.9
	275	12,830,850	16,643	20,341	49,000	31.3	29.2	34.7
	390	7,681,500	4,552	18,000	38,996	33.6	27.8	32.7

Table II.—Proportional Influence of Heat on Strength and Ductility. Taking Temperature of Room as 100°.

Properties.	Temperature, Degrees C.	Kind of metal.					
		Wrought iron.	Open hearth steel.	Copper.	Delta metal.		Manganese bronze.
					Rolled.	Cast.	
Limit of proportionality.	100	108	92	(124)	(138)	(136)	130
	200	55	76	(212)	(85)	(162)	340
	300	29	(50)	.....	.....	(90)	198
	400	25	26	.....	.....	.....	(158)
Limit of stretch.	100	100	99	(95)	112	(97)	87
	200	67	88	81	110	(119)	85
	300	64	(60)	56	75	(90)	88
	400	59	48	30	9	(17)	70
Ultimate strength	100	110	108	92	92	100	92
	200	131	125	61	72	82	89
	300	133	(113)	70	(50)	62	89
	400	91	92	48	16	20	71
Elongation 30 mm. from fracture.	100	54	56	66	110	126	94
	200	57	58	61	166	134	93
	300	94	(98)	75	158	270	(91)
	400	140	42	47	196	146	39
Contraction of area.	100	87	86	103	100	97	103
	200	83	69	96	148	118	97
	300	90	(93)	78	151	176	83
	400	104	62	18	148	100	30

Note.—The values for the figures in parentheses are not entirely reliable. Temperatures are given in round hundredths.

rup n, and was counterbalanced by rods t to the upper ring b. On the other hand, the upward stretch of the test piece pushed rod S<sub>1</sub> up against the

other point of steel piece or fulcrum *h*. Thus fulcrum *h* was tilted more or less out of the horizontal, which caused the mirror *m* to turn out of the perpendicular.

During the test the load was increased by 100 kg. and 50 kg., with the tests at

In Figs. 5 to 8, inclusive, the influence of heat of varying temperatures is graphically illustrated. The fractures of the test pieces are illustrated in the original. Those tested in the lead-tin bath were covered with a film of lead and show only the general appearance due to

300° C. At 400° C. the fractured surfaces are chisel shaped. The rolled delta metal shears off in uneven surfaces up to 200° C. At 300° and 400° C. fracture takes place at right angles to the axis of test piece. With the cast delta metal the appearance of fracture

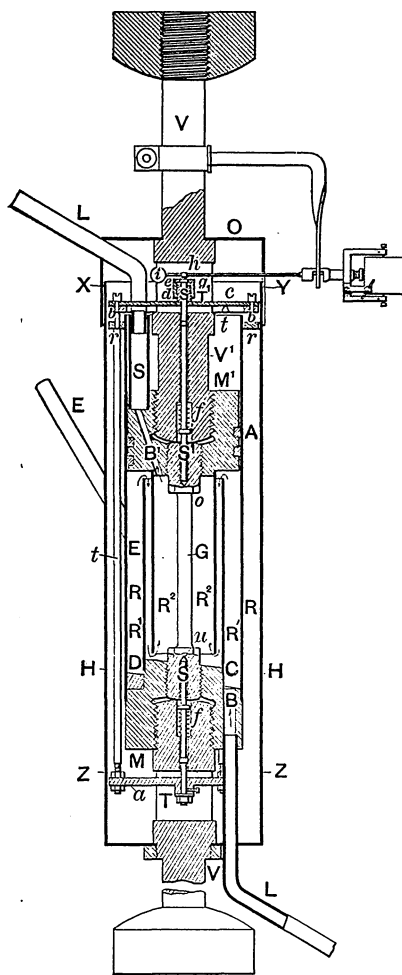


Fig. 1.—Section through Center.

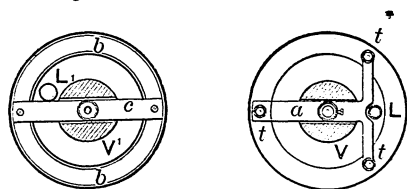


Fig. 2.—Section X Y. Fig. 3.—Section Z Z. Apparatus for Heating Test Specimens.

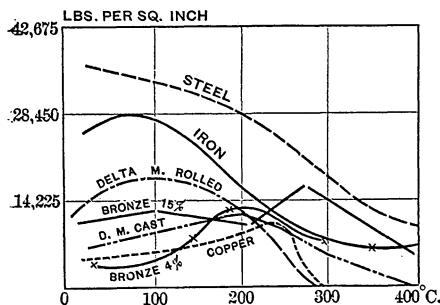


Fig. 4.—Limit of Proportionality.

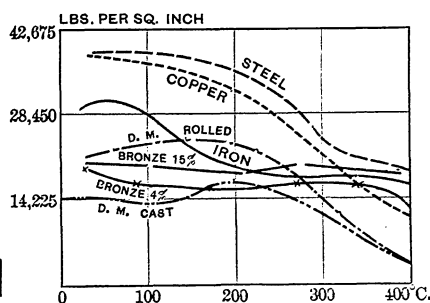


Fig. 5.—Limit of Stretch.

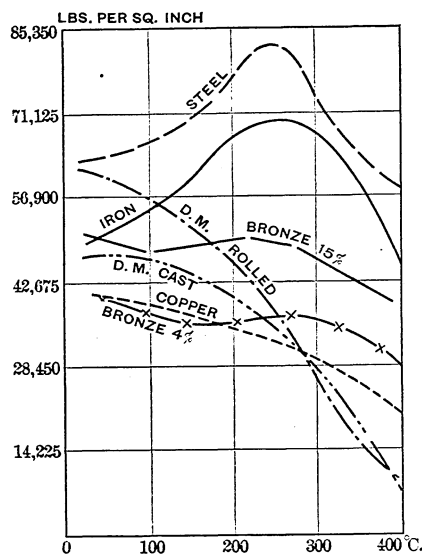


Fig. 6.—Breaking Load.

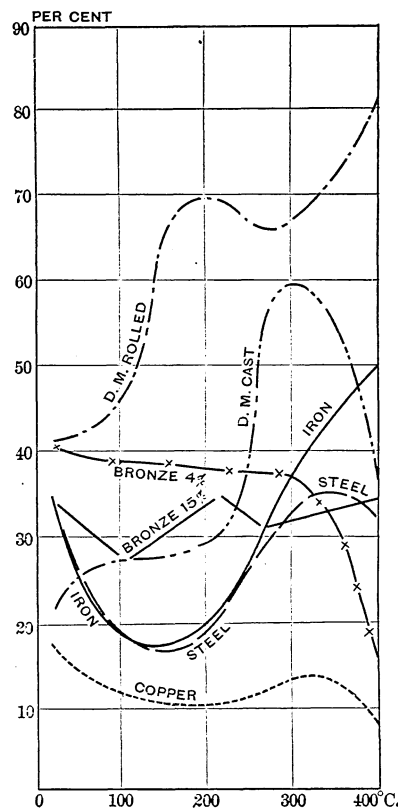


Fig. 8.—Elongation.

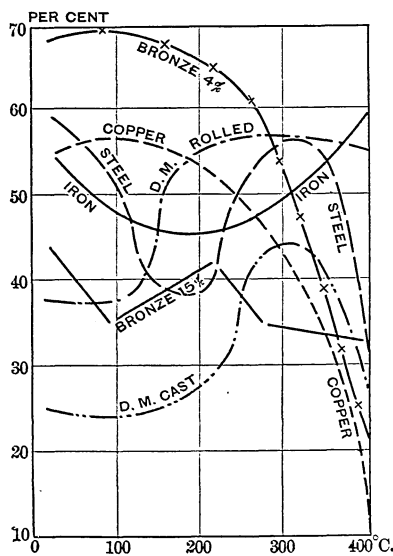


Fig. 7.—Contraction of Area.

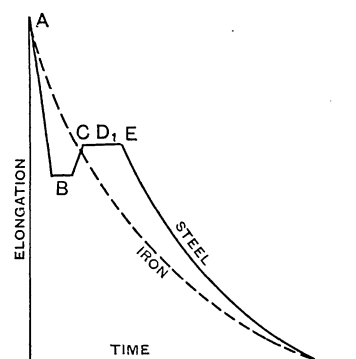


Fig. 9.—

#### THE INFLUENCE OF VARYING TEMPERATURE ON METALS.

400°. Elongation was measured in a total length of 90 mm. between datum marks, and also 30 mm. on each side of fracture. For this purpose test pieces were divided into divisions of 10 mm. In the accompanying tables the averages of results are given only. For details see the original.

contraction. Wrought iron shows but little tendency to a cup formation. At 400° C. the fracture is ragged. In open hearth steel the cup formation is very pronounced. At 400° C. the cups incline at an angle to the axis of the test piece and are somewhat "forked." Copper also shows cup formation up to

does not seem to be influenced by temperature.

The 4 per cent. manganese bronze shows double cup up to 300° C. At 400° C. the fracture is vertical to the axis of the test piece. Fractures of the 15 per cent. manganese bronze are even and granular at 100° C. At the

other temperatures they assume varying forms.

Mr. Rudeloff thinks these tests permit of drawing some conclusions in regard to the behavior of metals of the class tested, at high temperatures in actual service, with the understanding, however, that the results obtained with these tests may be modified in daily experience. Hence Mr. Rudeloff presents his conclusions more as suggestions for others to investigate further so as to prove or disprove them.

In iron and steel the elongation decreases uniformly up to 150° C., while the strength increases up to 250° C. This proves the deteriorating influence of high heat on iron, which has been known for some time to exist in steel. Beyond 300° C. there is a steady decrease in strength and increase in elongation of the iron. With steel the strength also diminishes at 300° C., but likewise the elongation. Judging from this, iron should not be worked below 300° C., while for open hearth steel this temperature should be higher. This conclusion agrees with experiments made at the works at Montlucan St. Jaques, where a temperature of from 700° to 800° C. was found the most suitable for working open hearth steel. These experiments were made to ascertain the changes in length of bars of steel while heating and cooling. When heated the bar extended up to a temperature only of from 650° to 725° C., according to the chemical constituents of the steel, and then remained almost constant until about 860° C. was reached. When the bars were cooling from 1000° C. down contraction took place quite uniformly at first, then the length of the bar remained constant for a few minutes, after which contraction began again. Then a second time the length remained constant for a while, when finally contraction continued without interruption to final cooling.

The cause of this phenomenon, which is illustrated in Fig. 9, was thought to be the changing of cement carbon into hardening carbon. This theory was confirmed by cooling bars suddenly at temperatures corresponding to A, B, C, D and E of the diagrams, Fig. 9, and subsequent analyses. No such irregularity was observed with iron.

With delta metal we observe the remarkable phenomenon of the elongation in the cast metal increasing but slightly up to 200° C., then rapidly up to 300° C., falling slowly after that. In the rolled metal elongation increases 50 per cent. up to 200° C., falls slightly between 200° and 300° C., and rises rapidly after that. From this we may conclude that cast delta metal is best worked at about 300° C., while the rolled metal could not be worked with advantage at that temperature. Whether this difference is due to molecular differences caused by rolling or a difference in chemical composition cannot be said.\*

The 4 per cent. manganese bronze would appear to be worked best at ordinary temperature, its elongation at that point being greatest. The number of tests made with 15 per cent. manganese bronze being small and the results not very reliable, no conclusions are ventured.

The limit of elasticity being of prime importance to the designer and constructor, since the permissible working load is determined by the elastic limit, it is instructive to examine the result

\*It is to be regretted that the chemical composition and the "mixture" of the metals experimented upon is not given by the author.

in this particular. On examining the diagrams it will be seen to what extent heat may change the properties of metals. The limit of elasticity of wrought iron, copper, rolled and cast delta metal and 4 per cent. manganese bronze is raised at 100° C. However, the decrease in elongation and increase in strength at and beyond this temperature indicate loss of ductility. This change of properties at increased temperatures does not make it safe to apply even the loads calculated for when the metal is under strain at ordinary temperatures. In comparison with the other metals open hearth steel behaves differently under like conditions, and appears to be a safer metal at temperatures up to 250° or 300° C. This advantage is modified by the higher modulus of elasticity and decreasing elastic limit beyond ordinary temperatures, which betokens some loss of elastic force.

Copper also loses in strength and elongation up to about 180° C. This impairs the value of the metal at higher temperatures to resist repeated strains. This probably explains the fact of copper which has undergone much hammering or rolling becoming brittle at higher temperatures, like steam pipes, for instance, which have to be annealed at stated intervals to prevent their breaking. A general application, however, of the foregoing is not advisable because the chemical composition of the copper tested is not known. With copper, as well as with wrought iron, fatigue tests with metals of known chemical composition and the amount of hammering or rolling these metals were subjected to before test will be necessary for establishing definite conclusions.

For the delta metal conditions are more favorable for the application of working loads up to 200° C. The limit of proportionality, limit of stretch and elongation rise to this point, while the strength decreases but slightly. Above 200° C. both the rolled and cast delta metal deteriorate rapidly.

Manganese bronze, both the 4 per cent. and 15 per cent., is the least influenced by high temperatures. Up to 250° C. these metals would seem to be quite safe for carrying the loads imposed upon them. Beyond the above temperature, however, the metals lose strength and ductility.

#### San Francisco News.

One of the notable features of the trade for the past few weeks has been the comparatively large quantity of merchant iron imported by rail. In three weeks 48 cars came along. In one week 26 cars. This activity cannot be traced to any corresponding activity in trade, for there is none, but to the apprehension that railroad rates would be advanced very materially. A stock is thus being laid in for the fall trade. There has also been a great deal of sheet iron and a very large amount of iron pipe imported by rail during the same time, and for the same reason there has also been considerable imports by sea, but not to the same extent as by rail. There are good stocks in the city, and, as a rule, the trade on the coast is well supplied. In fact, we could do very well without importations of much volume for some time. Country dealers have been buying but lightly, as their customers were not paying very promptly and as there was not much outlook for their paying any more promptly. The rains that we had some

time since were not followed up by others, and consequently fears for the crops have been the order of the day. More rain was wanted in certain sections, and unless it came those sections would, it might be said, have no crops. In some sections of the San Joaquin and Sacramento valleys irrigation is doing good work. In others, at the eleventh hour, individual farmers are doing their best to apply it.

It must be confessed that for a couple of months not much of a cheering character can be given out—that is, not until the grain has been well harvested and the fruit crop shipped East, either green, canned or dried. The Southern Pacific estimate that there will be 20,000 cars of fruit to go East this year. This is an increase of several thousand tons, while prices will be better. But all this will not come before next August or September. Consequently we cannot expect much activity in trade before then. By that time stocks of hardware and iron will have been considerably depleted.

We have been in receipt of a large quantity of agricultural implements by rail for the past two weeks. There has been somewhat of a spurt in the trade and for the time being a good demand both for Eastern and California made machinery, but it is not expected to last long owing to the dry weather and the eagerness of the farmers to do something in the way of irrigation. There has been an unusually large demand for gas engines and pumps to pump water from wells, and some of the dealers in and manufacturers of these articles have been pushed to the utmost capacity of their establishments to supply the demand. But this rush is probably at an end for the present.

Business in general hardware and in iron and steel has been light and doubtless will be so till next fall. Nearly every one in the trade is complaining, and it is a fact that they have made little or nothing for a whole year. The spring of 1893 was dull, but a good fall trade was looked for. Then came the financial troubles both here and in the East, and the decline in the price of silver, followed fast by that in wheat, the consequent tendency of farmers to hold their wheat, the lessened purchases by country merchants and the disinclination of the city trade to extend credit. Then, on account of the low freights prevailing, prices went down to the lowest figures ever known here, and those who had been carrying over large stocks suffered. It has been the most unfavorable year that the hardware trade has seen for more than a couple of decades, and now, at the threshold of a new year, they are confronted by changes in freight schedules consequent on the withdrawal of the North American Navigation Company from the field of competition, and leading they know not whither.

A firm of English electricians are trying to apply electricity to agriculture, especially for the operation of large plows. Should the experiments succeed they intend to introduce such electric plows in districts where the use of steam is inconvenient.

The Dupont Powder Company of Wilmington, Del., are fitting up a tract of land for use as a testing ground for the various grades of powder manufactured by them. A large gun recently made at Birdsboro, Pa., is to be used for testing the powder.

### Automatic Wire Cutting and Milling Machine.

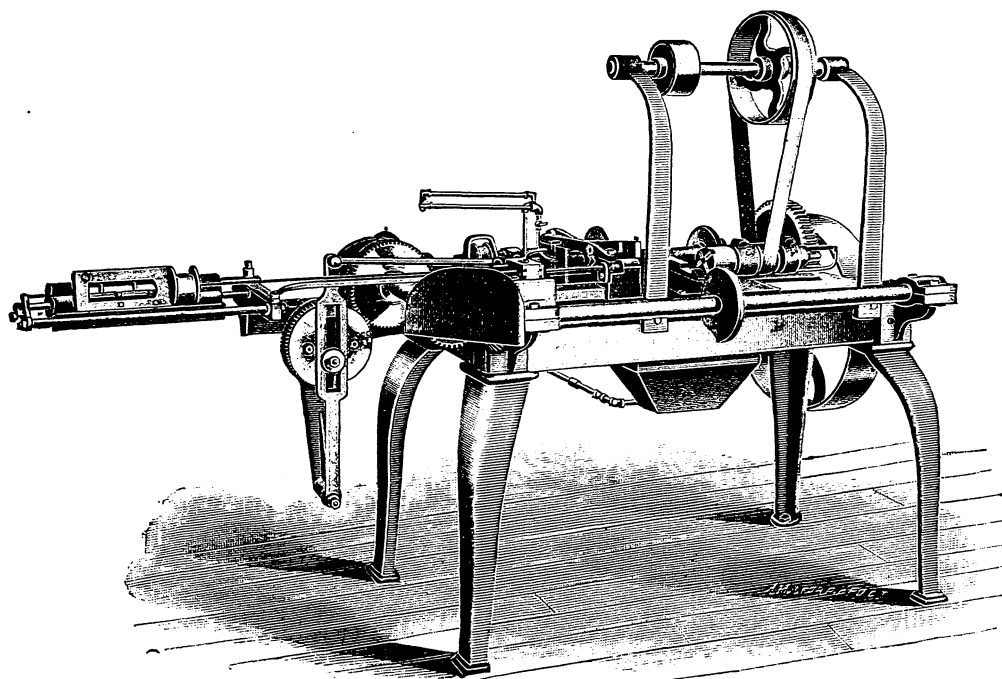
The Waterbury Machine Company of Waterbury, Conn., have designed a machine to take wire from the coil and automatically straighten, cut off and mill one end to a fine point, or round, beveled or tenoned end, as required. The machine will take wire in diameter from  $\frac{1}{8}$  to  $\frac{1}{2}$  inch and will cut it into required lengths from  $\frac{1}{4}$  inch to 10 inches. The capacity is from 15 to 40 wires per minute, according to the diameter and length of wire and nature of the end to be milled. The illustration shows the machine with a rotary straightener and positive grip feed, which for small wire is considered desirable. It is also fitted with a rotary pump which discharges a continuous  $\frac{1}{2}$ -inch stream of oil, keeping the wire and tool constantly lubricated. The face plate and feed lever are so connected with the gear that the nicest ad-

### The National Lead Company.

The directors of the National Lead Company on May 17 declared dividends of 1 per cent. on the common stock and  $1\frac{1}{2}$  per cent. on the preferred. At the time the dividend on lead common was passed last summer, the statement was made that while there was sufficient cash on hand to pay the same the management considered it inexpedient to use it, in view of the business depression and the threatened tariff legislation. The law of New Jersey, under which the National Lead are incorporated, stipulates that the directors shall from time to time distribute such amounts of the surplus as is compatible with the best interests of the company. The view taken by the management is that the company can spare this cash, and in consequence that shareholders should receive it. Directors repeated statements hitherto made that the company's business so far this year has been in ex-

similar piece of track with rails 30 feet long and angle bar joints. On the Pennsylvania lines west of Pittsburgh rails 33 feet long are being used a good deal; in fact we are informed that 25 per cent. of the rails purchased for 1894 delivery are 33 feet long. On the Pennsylvania Railroad proper, that is, the lines east of Pittsburgh, none of the 33-foot rails are being used, though experiments have been made with 60 foot rails for two or three years; but it has not yet been decided to adopt this length as standard. There appear to be no difficulties, and in fact the long rails are in favor with the trackmen. In one instance, on a heavy grade, trains running in one direction, descending, there has been considerable trouble from creeping, but probably no more than was experienced with the 30-foot rails.

Frank Steele, Charles Gifford and George W. Nelson of Oriskany, N. Y., discovered a few days since in the Mo-



AUTOMATIC WIRE CUTTING AND MILLING MACHINE.

justment can be obtained. The belt driving the chuck can be dispensed with, thereby rendering the machine useful for simple wire cutting.

The wire from the coil is strung up in the straightener by opening the upper rim of the latter. The wire is then gripped in the jaws of the positive feed and carried forward until it reaches the cut off lever, which is operated by a cam. At this juncture a pair of grips operated by cams hold the wire, and at the same time serve as a steady rest. The wire then comes in contact with the cutter and the milling is done. This cutter head holding the chuck runs in a dovetailed slide and can be moved backward or forward. The cams operating the grip can also be moved in the same way. By moving the cutter toward or from the cut-off lever, the length of wire cut off can be determined. The chuck runs at a speed of 3000 revolutions per minute. The builders tried a lower rate, but found the milling to be imperfect. After the wire is cut off it drops down a chute leading to a basin on top of the oil tank. This receptacle has a wire netting bottom, which allows the oil to run through into the tank.

cess of last year, and that the financial results, in spite of lower prices, have been greater.

**Long Rails.**—The Norfolk & Western Railroad have been experimenting with 60-foot steel rails. The *Railroad Gazette* states that the company have recently placed an order for rails cut in 60-foot lengths, with square ends, paying a premium of \$2 a ton over what would have been paid for rails of the same length (85 pounds per yard) cut in 30-foot lengths. This additional cost is balanced by the saving of one-half the number of joints. The reports of the last year show a considerable saving in the cost of maintenance with the long rail, and they show no increased trouble with expansion or creeping. On one section where the temperature has ranged from minus 15 to plus 110 no difficulty has been experienced. A special joint is used on the Norfolk & Western with these long rails, and the *Railroad Gazette* is told that reports show that the cost of track labor on a 10-mile section laid with the long rails (85 pounds to the yard) and the special joint is less than half of the cost on a

hawk River, opposite the old Oriskany battle ground, two solid round cannon balls in about 3 feet of water, imbedded in the clay. The balls weighed originally 30 pounds, as they weigh 29 $\frac{1}{2}$  now. The portion imbedded in the clay is in an almost perfect state of preservation, while about one-third of the surface is considerably corroded by the action of the water. It is calculated that the balls had been there over 117 years, as the battle was fought August 7, 1777.

The committee appointed by Secretary of the Navy Herbert to investigate the charges made against the Carnegie Steel Company, Limited, of furnishing the Government with defective armor plate finished their labors last week and have returned to Washington. It is given out that the proceedings of the sessions will not be made public, but will be incorporated in a report to be made to Secretary Herbert.

The closing of all the workshops of the Grand Trunk Railroad is being seriously felt in Canada. In Montreal alone some 2500 men have been thrown out of employment.



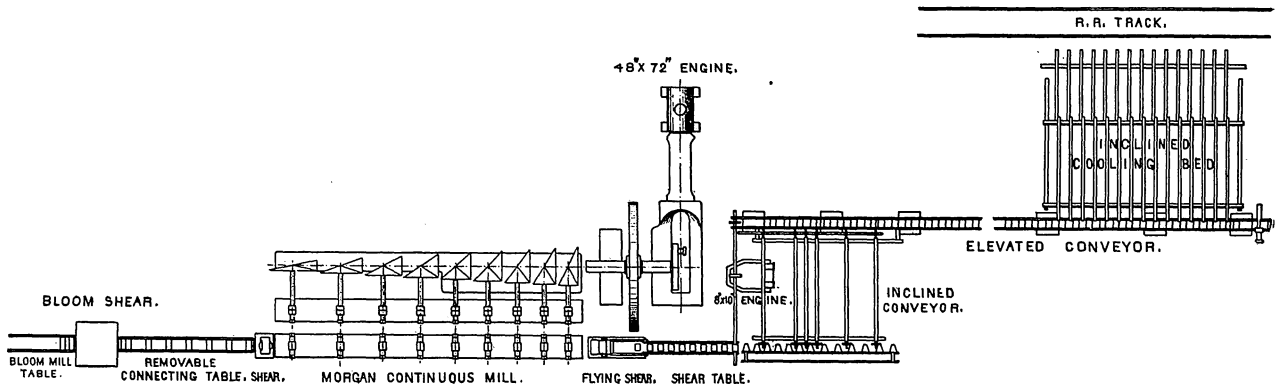
### The Morgan Continuous Billet Mill.

When the European engineers visited this country in 1890, as guests of the American Institute of Mining Engineers, the most striking features of iron and steel plants that commanded their admiration were the endless variety of new and improved facilities. It has been this fertility of invention by American engineers, together with the open handed expenditures of mill owners, that has placed this country where it is as the leader of the world in iron and steel. Foremost among the plants that have maintained a commanding position in this industry has been that of Jones & Laughlins of Pittsburgh, Pa. The demand upon them in recent years for the smaller shapes had increased so enormously that their old mills were inadequate to meet it, both in regard to amount of production and economy in producing it. They therefore opened negotiations with the Morgan Construction Company of Worcester, Mass., for the design and installation of a mill

then passed back and forth between the rolls of a blooming mill, and reduced to sections as small as 4 inches square. Further reduction below this point is seriously obstructed by the rapid cooling of the billet. As long as the metal is of heavy section its compact form renders it retentive of its initial heat. As it approaches, however, the smaller sections with their attendant increase in length the radiating surface exposed is so great and loss of heat so rapidly hastened that reheating becomes imperative. The undue length of the billet also becomes an impediment and forces its division into smaller lengths, it being impracticable to operate a furnace that would accommodate the full length uncut. Those familiar with the great rail mills of the country will recall the practice there commonly in use. In some, all billets intended for sections no smaller than rails are cut after leaving the blooming mill and placed in reheating furnaces. In others all the product of the blooming mill is cut, and though much of it is finished to a rail direct, still reheating facilities are ready and in frequent use. It will be noted that in all these cases the finished product is quite large (the section of an 80-

small sections as wire rods. With the finishing capacity of both limited by a train of high speed rolls a choice of two methods is presented—rapid reduction of the metal from the large to small sections, overrunning receiving capacity of finishing passes, compelling wide circuits between them, or slower reductions from large to small sections directly proportioned to receiving capacity of finishing passes, involving no circuits between them.

Waiting there must be somewhere upon the convenience of the finishing rolls. Shall it be at the beginning or at intermediate points? While the metal is in small sections most susceptible to loss of heat, or while in large sections most retentive of it? Belgian practice chooses the former, the continuous the latter. With rapid reduction of the metal from the large to the small sections the Belgian mill hurries it on to the finishing passes faster than it can be received. Seeking relief, the metal loops laterally upon the mill floor until each successive pass can gather it in, exposed all the while to the losses of oxidation and radiation. It is no uncommon thing to see loops 25 and 30 feet long thus exposing about 50 feet



MORGAN CONTINUOUS BILLET MILL, JONES & LAUGHLINS, LIMITED, PITTSBURGH, PA.

after the so-called continuous type. Though used for many years in this country, continuous mills have been confined almost wholly to wire rod rolling. After their erection by Geo. Bedson of Manchester, England, they were taken up by the Washburn & Moen Mfg. Company at a time when C. H. Morgan (now president of the Morgan Construction Co.) was their general superintendent. He warmly advocated the use of these mills as particularly adapted for rolling such small sections as wire rods. Before his recent withdrawal from the Washburn & Moen Mfg. Company, Mr. Morgan had erected several of these mills, whose superb records for output and economy evidenced his successful development of this type of mill and fully justified his faith in them. Following these, he designed and installed the continuous rod rolling plant of the American Wire Company, at Cleveland, Ohio. Familiar with the successes of these mills, Jones & Laughlins were encouraged to further investigate them, and finally install the plant for rolling billets, merchant bars and shapes herein described.

Some appreciation of the breadth and importance of the work attempted may be had by a brief reference to present practice. Bessemer ingots as they come from the converter are approximately 16 inches to 18 inches square and weigh about 2 tons. This mass of metal as drawn from the mold is placed in a soaking pit for a short time,

pound rail being by no means a small one), yet large as it is cutting and even reheating are employed. In this connection it will be observed that the method employed by the ordinary reversing or three-high mill directly favors cooling the metal. After it enters the bite of the rolls nothing more can be done upon it until the billet has traversed its entire length through the pass, has been reversed and re-entered. This is repeated at each reduction, the metal being all the while allowed to cool. In both these mills a considerable percentage of metal is lost by this undue exposure to the atmosphere, causing scaling by oxidation, as well as from the extra number of crop ends and shorts incidental to cutting.

From these considerations some conception can be gained of the problem the Morgan Construction Company undertook to work out—viz., to take the product of the blooming mill and run it directly down to sections as small as  $1\frac{1}{2}$  inches square, do it with the initial heat received at the converter, employ no cutting until finished product is reached, and minimize crop ends and scale waste. To accomplish this they made use of the continuous type of mill above referred to. The contrast between these and mills of the reversing and three-high type is strongly marked. Perhaps nowhere is the contrast more strikingly shown than in a comparison between the so-called Belgian and the continuous mill, both running on such

of metal to such loss. The continuous mill on the contrary holds its metal in the mass where, retentive of its initial heat, the corresponding radiation and oxidation losses are extremely small. Reduced only as finishing rolls can receive it, the metal passes without interruption through them. It is a fact of interest in this connection to note that the last end of a rod looping from one finishing pass to the next in a Belgian mill requires 50 times as long as it would in traversing the same pass of a continuous mill, making radiation and oxidation loss at this point 50 to 1 in favor of the continuous mill. The continuous mill veritably strikes while the iron is hot. With the rolls of successive passes placed as closely as possible before each other the metal rapidly passes the small distance between them. Loss of heat by radiation is reduced to a minimum, while that by scaling becomes exceedingly small. Indeed, so great is the contrast between these two types of mills when in use on small sections that elements antagonistic to the success of the one directly contribute to that of the other. The long lengths and small sections so in conflict with economical performances in the blooming or three-high mill tend rather to contribute to the success of the continuous mill. Great lengths not only cease to be an objection with the latter, but are in fact to be desired, as the loss from crop ends or shorts is thereby largely eliminated. Small sections present no



obstacles. Indeed, the rapid rolling demanded by them gives rise to one of the most interesting features of the continuous mill—viz., increased heat during reduction. So frequently is the billet wrought upon in its passage from pass to pass that the energy expended upon it is manifested in added heat. Precisely as the metal on the blacksmith's anvil may be heated by frequently delivered blows, so these small sections are heated by the frequent action of rolling. Some heat must necessarily be lost in transit from roll to roll, but it is retrieved by that received from the operation of rolling, and this, too, notwithstanding the rolls are flooded with water.

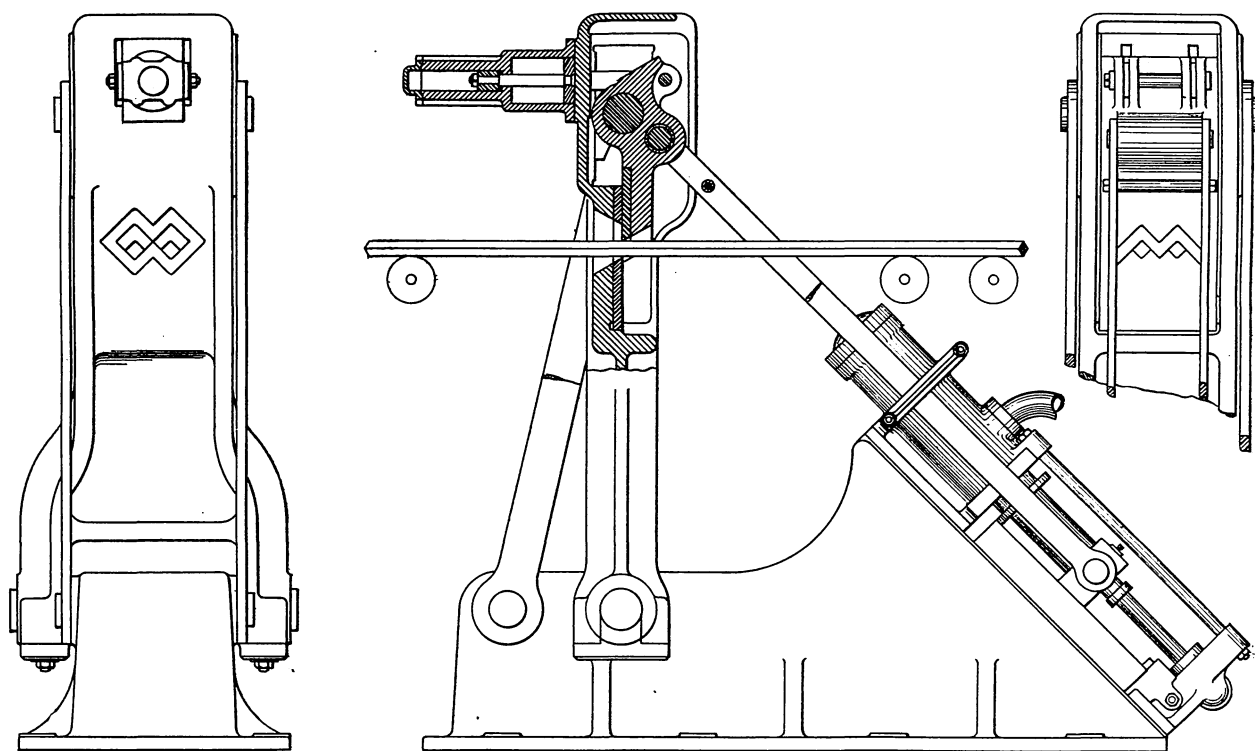
It will be remembered that the ingot when rolled to a 4 x 5 inch bloom is about 80 feet long. When delivered from the last pass of the finishing rolls at 1½ inches square it is some 600 feet long. It was found impracticable

course was therefore had to a new and novel form of shear. This "flying shear," as it has been called, is the invention of Victor E. Edwards of Worcester, Mass., who has been connected with a number of the rolling mills in the country, and is now a member of the Morgan Construction Company and one of their corps of engineers.

The shear is shown in the accompanying engraving. It carries a sliding knife on the swinging frame trunnioned to the heavy base. This frame describes a small arc of a circle at a speed corresponding to billet, severs it, and returns ready for a repetition. The shear is worked by hydraulic pressure supplied by a steam intensifier, the operating valves being opened by trigger automatically tripped by the billet in its passage from the finishing rolls. A similar though stronger and slower shear is placed at the receiving end of the continuous mill to crop the ends

became necessary to elevate and convey the billets beyond them. This system of conveying is shown in the accompanying sketch. It is a curious fact, illustrating the rapidity and smoothness with which this system works, that a 4 x 5 billet can be received from the blooming mill and have its first end rolled to 1½ inches, cut to length, conveyed to cooling bed preparatory to shipping before last end of bloom has left the blooming mill table—that is, of the original ingot, there can be at the same time part of it on its way to the continuous mill to be reduced, part of it in the continuous mill in process of reduction and part finished and delivered to cooling bed.

The American Tin Plate Machine & Mfg. Company, Linfield, Pa., have their plant in full operation, turning out 10 tons per day of finished plates.



FLYING SHEAR FOR MORGAN BILLET MILL.

to allow such a length of metal to be discharged intact from Jones & Laughlins' mill. Their yard room limitations alone forbade it. To provide, then, some suitable means for handling this product was another phase of the problem with which the Morgan Company had to deal. This they proposed to meet by placing at the finishing end of the mill such equipment as would automatically cut the metal as it emerged from the finishing pass, convey it, cool it, and deliver it on cars or in stock. Some idea of the difficulty of the problem may be gained by remembering that when rolling to 1½ inches the mill is delivering its product at the rate of 6 or 8 feet per second. This delivery is equivalent to about 1 ton a minute. To control this large output no existing facilities were adequate. It required a departure into the new and untried. It will be readily understood that no ordinary shear could be used to cut metal traveling at such a speed. Any interference with its onward movement would either buckle the billet or demolish the interposed medium. Re-

of blooms that may come from the blooming mill with imperfect ends.

This continuous mill is the most massive of its type built. It has nine stands of rolls driven from the extended shaft of a 48 x 72 Reynolds-Corliss engine. The rolls and pinions are in separate housings, mounted on separate longitudinal beds, running the entire length of mill, a third bed carrying driving shaft. This mill is placed in line with Jones & Laughlins' No. 1 blooming mill, with which it is connected by a roll table. When not in use this table can be quickly tipped on end, leaving the floor clear for doing ordinary finished blooming mill work. An intimate connection can thus be made between blooming and continuous mills and withdrawn at pleasure, allowing the former to be used in the ordinary way.

At the delivery end of continuous mill beyond the flying shear is placed a system of feed rolls, conveyers and cooling beds for receiving the finished work. So great was the network of broad and narrow gauge tracks at this part of Jones & Laughlins' yard that it

The concern have recently closed a contract for the sale of their entire output for some time to come. This firm are owners of the Buckman automatic continuous seaming and tinning machines.

What is claimed to be the largest natural gas well in either the Ohio or Indiana fields was drilled on the Wallace farm, three miles west of Fostoria, Ohio, on the 14th inst. The lease is owned by the Chicago Oil Company, and the well was started in territory which was considered worthless.

The citizens of Green Island, N. Y., have raised over \$2000 at a public meeting as a fund to be used to encourage manufacturers to locate there. Speeches were made and a committee named to further solicit subscriptions.

The House Committee on Commerce have favorably reported the bill providing for a bridge across the Delaware River at Tacony, near Philadelphia.

# The Iron Age

New York, Thursday, May 24, 1894.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.  
CHAS. KIRCHHOFF, - - EDITOR.  
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.  
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.  
JOHN S. KING, - - BUSINESS MANAGER.

## Discouraging Business Conditions.

It is a trite saying that misfortunes never come singly. When things are going wrong our woes seem to multiply. Having struggled with a financial depression of unprecedented severity and barely escaped national bankruptcy, we are confronted with further troubles which impede our efforts to regain a portion of our former prosperity. At a time when patient industry is most essential in upbuilding the fabric of confidence, labor troubles intervene to check the work and continue the wearisome reign of disorganization. Just as employers of labor are gradually feeling their way to a resumption of operations and more workmen are again finding their names on pay rolls, the demon of discontent begins his fell work and strikes become prevalent. The knowledge that more workmen are obtaining employment causes those whose wages have been reduced to believe that prosperity has returned and that they are being unjustly treated. Instead of feeling thankful that employment can again be secured, they murmur at the low wages paid and revile the men who are endeavoring to provide them with work. They are consequently ready to follow the advice of labor agitators and abandon their tasks when the word of command is given by their despotic leaders. Business is now seriously depressed over a great part of the country, simply because men refuse to work and not because they are unable to find employment. The condition is reversed from that obtaining last autumn and winter.

Congress is condemned, and justly, for its inaction on momentous public questions, but workmen are almost, if not quite, as much to blame now for a continuance of the business depression as Congress. If every able bodied workman in the United States should make an effort to obtain employment whereby he could earn some kind of a living, even if the pay for the present should be scanty, endeavoring at the same time to live frugally and forego the luxuries of a happier era, he would be taking the very best course to bring about the restoration of good times and the return of business conditions which would enable employers to pay better wages. The man who refuses to work for \$1 because he formerly earned \$1.25 to \$1.50 or for \$2 because he once found his labor bringing \$3 is unwittingly a stumbling block in his own path as

well as that of his neighbors. In idling away his time pending the settlement of a strike he eats up his savings, runs heavily into debt or else becomes a burden on the community in which he lives or on the trade organization to which he belongs. At work he helps to support the community in which he lives; on strike he is a detriment to it. We believe firmly that if from January 1 of this year up to the present time there had been no strikes whatever in any part of this country, but every workingman had honestly striven to secure employment at something, even if he had to go from home to hunt it, there would be little distress within our borders and symptoms of improvement in business would be apparent on every side.

Strikes are sometimes justifiable. Men are not slaves in our time and should not be treated as such. But the strikes which have taken place this year and are now in progress are of the wrong character and have been precipitated at the wrong time. Even if men are now being paid low wages and can barely support their families on what they earn, they are better off than with no employment, trusting to the charity of a notoriously cold world. An instance of this kind is found in a large manufacturing establishment in the West whose employees to the number of several thousand recently struck for higher wages, although they were assured that contracts had been made below cost merely to keep them at work and they were given the opportunity of inspecting the books of the company to verify the statement. They are now "out," the works are shut down to stay closed for an indefinite time, and stories of distress among the workmen's families are already heard. It is infamously cruel for labor agitators to lead their poor dupes into such a mire of hopelessness in times like these. The man who grinds the face of the poor is a wretch, but his misdeeds are light compared with the actions of the miscreant who preaches discontent and foments labor troubles in these dark days. He would be far wiser to teach his followers patience, frugality and temperance, so that they would be the stronger and better equipped for enduring a struggle for better wages after the times improve, if it should then be found that the just demands of labor are ignored.

Extensive as the strikes are which are now on, they would not be so serious if they did not involve other persons than the strikers themselves. But a spirit of lawlessness has sprung up which is a part of almost every strike. Those who are satisfied with their pay or who wish to work to get bread for their families are attacked by strikers and driven away. Lives have been taken in this attempt to make strikes universal in different trades. Further than this, other industries are often affected by strikes, and workmen are thrown idle who have no connection whatever with the strikers' voca-

tion and are extremely anxious to be employed. It has been well said that "a civilization in which such a state of affairs is possible is far from perfect."

## Electrically Driven Tools.

It would be difficult to find in machine shop methods of the past a more rapid and radical change than the one produced by the electric motor. We meet it in every industry, above ground and under ground, driving machinery of every description, sometimes devoting all of its energy to driving one tool requiring large power, and at other times operating a short line shaft from which a gang of small tools is driven. Considering the wide field it now occupies and the diversified duties it performs, it seems wonderful that so few motors are discarded because they have failed to do what was expected of them. The practical trial of the motor has created confidence in its general capability. That this did not exist two years since, even in the minds of progressive manufacturers, is shown by the following incident: The head of one of the largest establishments in the country, when asked why he did not put in an electric traveling crane instead of a square shaft crane, in the changes he was then making in his plant, said: "If, when we made our plans, we had been as convinced as we are now of the reliability of the electric motor, we should certainly have provided an electric crane." The rapidity of the introduction of the motor is shown by the fact that there are now some large plants driven by motors exclusively.

Advocates of the electric motor have always claimed that its most important advantage as compared with the method of transmitting power by shafts and belts, has been in economy. It has been stated that the efficiency of both dynamo and motor is high, that the loss in conductors is nominal, and most important, that there is no wasted energy, since when the machine stops all expenditure stops and the saving is traced direct to the coal pile. To verify these claims we need reliable data giving power consumed by tools of widely varying character and doing work of all kinds, and compare these results with like ones obtained from tools driven in the usual way. Steps are now being taken in order to obtain this information in the case of electrically driven machines.

As bearing on this question we take the following from an address recently delivered by the president of the Institution of Mechanical Engineers, Prof. A. B. W. Kennedy:

I have found, from information very kindly given me by several large engineering firms, that the actual cost to them of power, including coal, stores, wages and depreciation, generally lies between 2 and 5 per cent. of their total costs. In any given factory running on the ordinary system there is a large continuous waste of power, due to the running of the whole shafting, on matter how many or how few machines are at work. Under such conditions the waste

work in shafts and belts may well be even 25 per cent. of the average useful work, and the distribution of total work may be approximately :

	Horse-power.
Average useful work.....	100
Wasted in belts and shafting .....	25
Wasted in engine friction, the engine being supposed large enough to give 150 horse-power at tools as a maximum (at about 10 per cent. of maximum horse-power).....	20

Total..... 145

Now, if all the machines in such a case were driven by separate motors, each having an electrical efficiency of 88 per cent., and these motors worked from a dynamo having an efficiency of 92 per cent. (both of which are high figures for ordinary work at two-thirds output), the figures would stand as follows :

	Horse-power.
Average useful work.....	100
Wasted in motors and dynamo .....	24
Wasted in leads (say 2 per cent.) .....	2
Wasted in engine friction (as above) ....	20

Total..... 146

It will be seen that the two sets of figures are practically the same as to amount of power required. As the electrical efficiencies which I have assumed are not likely to be exceeded, I think it may be said that there is no saving to be obtained in horse-power, and none therefore in any of the items of cost directly dependent on horse-power, in cases where the power wasted in shafting and belts does not exceed 25 per cent. of the whole average useful power.

The above might apply to machinery running continuously, but the time during which a machine is idle and from which the greatest item of economy is derived is not considered. This point is most essential, and it is one concerning which there is but scant knowledge.

#### The Hawdon and Howson Blast Furnace.

Thus far only a few scattered newspaper paragraphs have served to whet the appetite of the metallurgical world concerning the experiments which have been carried on for quite a considerable time at Middlesborough, England, with a blast furnace of novel design. In *The Iron Age* of April 19, 1894, we printed a sketch indicating the lines of the Hawdon and Howson furnace. Now, for the first time, authoritative data concerning the results obtained have been brought forward by William Hawdon in a paper read before the recent London meeting of the Iron and Steel Institute. What is possibly more interesting to many, Mr. Hawdon has also developed the considerations which led to the design. He starts with the idea that it is desirable to obtain as large and intense a melting zone as possible, which is attainable by so disposing the materials as to allow of the most advantageous diffusion as well as concentration of heat. The materials must come down to it thoroughly heated and thoroughly reduced. The bosh is necessary in order to obtain capacity so that there is enough burden to abstract the heat from the ascending gases, and it is needed to support the materials and thus prevent the too dense packing of the materials in the zone of fusion. The keynote of the design is that they make the lower part of the furnace of com-

paratively narrow dimensions and enlarge the upper part by upper boshes. They want to avoid the risk of crushing the fuel and obstructing the blast by the mere weight of the column. They want capacity in the upper regions because there the charge is in a dry and porous state, where reduction takes place, and because with the greater area the bulk of ore acted on and reduced will be greater.

As for the results attained thus far, Mr. Hawdon gives the following data : With the new form of furnace the average make over a period of 12 consecutive weeks was 680 tons per week, with a consumption of fuel, expressed in fixed carbon, of 16.64 hundredweight per ton of iron made. It may be remarked in this connection that Mr. Hawdon considers this the fairest method of comparison. He deducts from the coke consumed the weight of the ash and of the volatile matter. With a furnace built on the old lines the average make was 458 tons per week, and the consumption of fixed carbon was 19.5 hundredweight per ton of iron. The furnaces were being run on No. 1 and No. 3. With the Hawdon lines the average quality was 2.83, while with the ordinary furnaces it was 3.02, thus showing that the grade was better, the furnace working more regularly. Mr. Hawdon believes that even better results will be obtained with a new furnace in which the upper bosh is placed higher. In the furnace now working the low position of the upper bosh caused the materials to pack and form a dry arch when the furnace was completely filled. To avoid this the furnace was only filled 20 to 22 feet above the upper bosh, so that the capacity was reduced to 18,100 cubic feet. Occasionally it was further filled, so that the working capacity rose to 21,000 cubic feet, and then a marked saving of fuel followed. Scaffolding, however, soon forced a return to the lighter filling.

The attitude of the English iron masters, as indicated by the discussion following the paper, was generally reserved. Evidently a further accumulation of evidence is expected before the conservatism of the blast furnace managers is overcome. Those who control the plant evidently have faith in the value of the new lines, because a second stack is being built. One point which was hinted at in the course of the debate was that probably tenderer coke could be used in furnaces built in accordance with the Hawdon and Howson design. In some localities that alone would be an important advantage quite irrespective of any gain in fuel consumption and in regularity of working. The achievements thus far are so encouraging that iron masters must watch closely further developments.

In the letter published in *The Iron Age* of May 17, page 943, on "Coking in Retort Ovens and the Recovery of By-Products," an error was made in the table of analysis of gas on page 944,

third column. In the heading of the analysis the figures for coal gas were given under natural gas, and those relating to natural gas were given under coal gas.

#### OBITUARY.

HENRY M. PEIRSON.

Henry M. Peirson died at his home in Pittsfield, Mass., on May 8. Mr. Peirson was born at Richmond, May 10, 1825. He was educated in the public schools, and during his early manhood taught school in Richmond. In 1849 he came to Pittsfield, and with the late Dr. Stephen Read engaged in the agricultural implement business under the firm name of Read & Peirson. About the same time in conjunction with Dr. Read and Varnum T. Hull he opened a printing office, and for some years published the *Culturist and Gazette*. In 1853 he retired from the firm of Read & Peirson to enter the hardware business in company with the late George N. Dutton, under the firm name of Dutton & Peirson. This partnership was continued until 1876, when Mr. Dutton withdrew from the firm to engage in the tack manufacturing business, and Mr. Peirson's eldest son, Henry R. Peirson, came into the firm, the style becoming Peirson & Son. In 1891 a second son, Frank E. Peirson, was taken into the concern, and the firm style changed to that of the Peirson Hardware Company, which still continues. Mr. Peirson was a coroner for 14 years, and held the office until the law was changed abolishing that office and appointing medical examiners. He was for many years one of the assessors of Pittsfield and also special county commissioner for one or two terms. He represented the town in the general court in 1889. Mr. Peirson was for years associated with the Berkshire Agricultural Society as director, treasurer and president. He was a trustee of the Berkshire County Savings Bank and the Berkshire Athenæum.

#### PERSONAL.

At Pittsburgh John Caldwell has resigned his position as treasurer of the Philadelphia Natural Gas Company, but at the urgent request of the officials his resignation will not formally go into effect for six months. Mr. Caldwell will remain a director of the Philadelphia Company and will also retain the treasurership of the Westinghouse Air Brake Company. Mr. Caldwell sailed for Europe on Saturday, May 19, and expects to remain abroad for four or five months.

A. R. Perry, for many years identified with the malleable iron business in this country, has recently accepted the position of traveling representative of the Dayton Malleable Iron Company of Dayton, Ohio.

The Committee of Science and Arts of the Franklin Institute of Philadelphia have awarded Ellwood Ivins of the Ellwood Ivins Tube Company the "medal of superiority" for his achievements in high class seamless tube making in steel, brass, aluminum, &c. This plant produce weldless and seamless tubing in all metals in sizes from 5 inches in diameter to a size as small as human hair.

C. B. Holland, formerly general manager of the Ebbw Vale works and of Bolckow, Vaughan & Co., is expected in this country on a visit to the Otis works, of which he is a director.

## CORRESPONDENCE.

## Machinery vs. Muscle.

To the Editor: This month records the nineteenth anniversary of my subscription to *The Iron Age*. It has been with a pronounced degree of pleasure and profit that I have diligently perused your editorials. I now take the liberty of referring to your article entitled "Machinery vs. Muscle" in the issue of May 3, 1894, and earnestly request that you treat the subject in even a more extended manner.

I am frequently engaged in a wordy war with those who feel that machinery is rapidly encroaching upon and menacing the happiness and general prosperity of the masses of this great nation through displacing hand labor. They instance notably stove manufacturing machinery. Their pessimistic argument is that the masses will not have the earning opportunities to enjoy the results of these improvements. Let products be as cheap as they will, they will have no money to buy. My argument in rebuttal is that the high order of civilization enjoyed by this country is in great measure due to labor saving machinery, and that our large towns are miniature cities, and our plane of general living is beyond the most sanguine dream of our founders. I cite India as a striking contrast, where certain kinds of machinery are suppressed if I am correctly informed. Now, compare the condition of the masses of the two nations. Not desiring to trespass further upon your very valuable time, I believe you can readily catch the trend of the argument pro and con and feel assured that you can enlighten both sides.

FRANK C. BEALL.

FROSTBURG, MD.

## That Sensitive Test Bar.

To the Editor: E. H. Mumford in *The Iron Age* of May 17, 1894, has drawn wrong conclusions regarding the size of test bars from the paper I read before the Eastern Foundrymen's Association on May 2. I did not there cite any size in section as being the best. That question I reserved for later discussion.

The whole value of Mr. Mumford's criticisms lies in his ability to sustain the supposition "if" found commencing this third paragraph. Here he wants to tell us "if a water cylinder 3 inches thick and weighing 8 tons gives a test bar 450 pounds strength, 155 in contraction and 0.08 inch chill," we may know just what to expect in the casting. I will say we cannot tell any such thing. We may by chance "hit it," but as for being absolute, the metal, which perchance might burst or run into a large vent hole, would be a safer guide in judging of strength than data obtained from  $\frac{1}{4}$ -inch square test bar. I admit that we may foretell or judge something by the contraction and chill, but this is of very little value in determining what reliance we can place on data obtained from the breaking load of  $\frac{1}{4}$ -inch square test bar.

If Mr. Mumford will prove from Keep's tables that the strongest castings down to the commonest cannot be made from "stove plate" iron mixtures, he will do more good in demonstrating the absoluteness, &c., of Keep's system than if both of us filled the pages of *The Iron Age* for a year with propositions and logic founded on "if."

By an examination of Mr. Keep's latest tables any one can find a "stove

plate" mixture giving a strength ranging from 313 pounds up to 508 pounds with a test bar  $\frac{1}{4}$  inch square, 12 inches long. To reduce the strength of these bars to 1 inch square, Mr. Keep says, multiply by 8. By this, gun metal is "not in it," and engineers must commence to look to a stove plate mixture when they desire something very strong and recognize "stove plate" iron as all sufficient, or ahead of strong machinery mixtures, to meet all requirements from a Krupp cast gun down to an engine crankshaft or a water cylinder. That, tell Mr. Mumford, is what Mr. Keep's little sensitive test bar can do. By its guidance we would be making strong castings out of weak iron.

THOS. D. WEST.

## Changes in the Metal Schedule.

Debate on the metal schedule has begun in the Senate. The following additional amendments have been proposed by the majority. Their effect, it will be observed, is to further substitute specific for ad valorem rates where they had been left unchanged before.

On bar iron, which was 28 per cent. in the Finance Committee bill (25 per cent. in Wilson bill), the Jones amendment reads as follows, the rates of the present law being bracketed:

Bar iron, rolled or hammered, comprising flats not less than  $\frac{3}{8}$  inch thick,  $\frac{1}{16}$  cent (0.8 cent) per pound; round iron not less than  $\frac{1}{4}$  inch in diameter and square iron not less than  $\frac{1}{4}$  inch square,  $\frac{5}{16}$  cent (0.9 cent) per pound; flats less than 1 inch wide or less than  $\frac{3}{8}$  inch thick, round iron less than  $\frac{1}{4}$  inch and not less than  $\frac{1}{8}$  inch in diameter, and square iron less than  $\frac{1}{4}$  inch square,  $\frac{7}{16}$  cent (1 cent) per pound.

The boiler plate clause has been again changed from that published in *The Iron Age*, page 893, to read as follows:

Boiler or other plate iron or steel, except saw plates hereinafter provided for, not thinner than No. 10 wire gauge, sheared or unsheared, and skelp iron or steel, sheared or rolled in grooves, valued at 1 cent per pound or less,  $\frac{5}{16}$  cent per pound; valued at 1 cent and not above  $1\frac{1}{2}$  cents,  $\frac{7}{16}$  cents per pound; valued at above  $1\frac{1}{2}$  cents and not above 4 cents per pound, 30 per cent. ad valorem; valued at over 4 cents per pound, 25 per cent. ad valorem; provided, that all plate iron or steel thinner than No. 10 wire gauge shall pay duty as iron or steel sheets. The Wilson rate was 25 per cent. and the Finance Committee had 30 per cent.

The forgings paragraph has been changed again and now reads:

Forgings of iron or steel, or forged iron or steel combined, of whatever shape or in whatever stage of manufacture, not especially provided for in this act, 30 per cent. ad valorem; provided, that no forgings of iron or steel, or forgings of iron and steel combined, by whatever process made, shall pay a less rate of duty than 35 per cent. ad valorem.

The ad valorem rate on hoop, band or scroll iron and steel, except as otherwise provided for, has been left at 30 per cent., the rate of the Finance Committee.

The freight rate on pig iron from Big Stone Gap, Va., via the Louisville & Nashville Railroad to Baltimore, Philadelphia and New York is now \$2.89, and to Boston and Providence \$3.24. From Middlesborough, Ky., to the two groups the rates are \$3.14 and \$3.49, respectively.

## Washington News.

(From our Special Correspondent.)

WASHINGTON, D. C., May 22, 1894.

Since the engagement between the "Monitor" and "Merrimac" no event in offensive and defensive construction of naval vessels has created as great a commotion among ordnance experts as the recent test at Indian Head of the 18-inch armor plate manufactured by the Bethlehem Iron Company for the side armor of the battleship "Indiana." The plate itself, nickel steel Harveyed, was the heaviest ever forged, and was regarded as the culmination of this branch in the defensive equipment of modern battle ships. The test was therefore not of purely local interest and importance in a national sense, but was of international concern. The trial was awaited by the naval *attachés* of the greater governments represented at Washington.

Commodore Sampson in speaking of the result said: "The effect of the impact was tremendous, as we have seen, but we will give the plates of this group another test. The result was wonderful. It demonstrates the achievements we have made in the manufacture of high power guns, powder and projectiles. It is not right to express any opinion concerning the plate, as it was under suspicion and for that reason was selected. I do not mean suspicion on account of faulty manufacture, but its physical conditions imperfect on account of the severity of the treatment to which these plates must be subjected in their manufacture.

"We have about reached the limit of high power guns. The 12-inch is the most effective in work and results. That was again demonstrated to day. Now it is a competition between plates and projectiles. One must resist, the other must destroy. It will be of great importance to the nautical nations of the world to watch the results of these experiments. I regard them as the most important of all the tests we have ever had and ours have had no rival in the world.

"We had better reserve any conclusions about 18-inch plates and about this group until we have the next trial. That will demonstrate something. We will have the benefit of this experience and the scientific and naval world will be on the lookout."

In a pecuniary sense the rejection of this group of plates, about 618 tons, if the next trial turns out as the last, will entail a loss of about \$300,000 to the Bethlehem Company.

The performance of the plate was a decided disappointment. The highest compound armor tested by foreign governments has been 22 inches thick. The results are reported unsatisfactory. It was supposed that 18 inches of nickel steel would show favorably. This is still to be determined. There are authorities who are not in favor of surface treatment of the heaviest plates. The next test will doubtless be one of the most important ever had. It may cause another revolution in the science and art of modern naval shipbuilding.

The views of Mr. Carpenter on the subject of the manufacture of armor piercing projectiles were read in *The Iron Age* by the ordnance experts at the Navy Department with great interest, and were the topic of much earnest conversation. They claim that it has been conclusively demonstrated that the United States can produce a better shell than any in the world. This has been

shown by the abandonment of the Holtzer, which was the last of the foreign projectiles used in our armor plate tests. All scientific tests are now made with American projectiles, the Carpenter taking the place of the Holtzer.

### Pittsburgh and the Coal and Coke Strikes.

We are in receipt of advices from a number of the leading Pittsburgh mills and blast furnaces showing to what extent the coal and coke strikes have interfered with operations. It will be observed that some concerns had a large amount of coal on hand when the strike started and which has not as yet been exhausted. Other concerns are paying from \$4 to \$5 per ton advance for coal, while some mills use natural gas entirely and will be able to run right along. Our advices cover operations up to May 21, and are as follows:

Lindsay & McCutcheon, Star Iron Works, Allegheny: "The coal and coke strikes have had no effect on us so far. We are only using coal under our boilers. We have considerable muck bar on hand and are not running our puddling mills, but are running our finishing mills single turn."

Chess Brothers: "We have been able to get so far all the coal we require for the small part of our works that we want to run."

Crescent Steel Company: "None whatever, as we had stock on hand."

Pittsburgh Steel Casting Company: "Our operations as yet have not been curtailed in the least on account of the coal and coke strikes."

Dilworth, Porter & Co., Limited: "We have not been affected by the coal and coke strikes, as we are at present using natural gas entirely for fuel."

Carbon Steel Company: "The coal and coke strikes have so far not affected the operation of our mills. We use natural gas for fuel entirely."

Liggett Spring & Axle Company: "We are operating day and night, and so far have had no interruption in our fuel supply, which is furnished us by the Hunter Coal & Sand Company."

W. Dewees Wood Company, McKeesport, Pa.: "We are not large consumers of coke, and use natural gas almost entirely for fuel. The coal and coke strikes have not affected our operations to any extent."

J. Painter & Sons Company: "We use natural gas entirely in operating our mills, and the coal and coke strikes have not affected us at all. We are running full in every department and do not expect to be affected by the strikes in the least."

Chartiers Iron & Steel Company, Limited: "We use gas entirely at our works and are not directly affected by the strikes."

Singer, Nimick & Co., Limited: "Having stocked a large supply of coal before the strike, our operations have not been curtailed any on that account."

Moorhead-McCleane Company: "We are closed down at present, but as we operate our plant principally by gas the coal and coke strikes do not affect us very materially."

Pittsburgh Forge & Iron Company: "Our mills are not affected by the coal strike as yet, we having a supply of fuel that will last us for some time."

H. Lloyd Sons Company: "Our operations have not been curtailed to any extent by the coal and coke strikes, simply for the reason that we have not been able to operate our mills with any

degree of regularity on account of the depressed state of trade."

The Linden Steel Company: "We had some coal, and have been getting natural gas, so that we have not as yet felt the coal strike, as we have not been doing very much business."

Phillips, Nimick & Co., Sligo Rolling Mills: "We have at this time idle, on account of the coal strike, 38 puddling furnaces, 2 scrap furnaces and 8 heating furnaces. This represents about four-fifths of our capacity."

Jones & Laughlins, Limited: "Our production of pig iron has almost entirely been cut off for the past few weeks on account of the coke strike, but we happen to have a fair stock of pig iron on hand, which has enabled us to run our steel works and finishing mills pretty full, although there has been some decrease in production on these latter mills brought about by interruption of supply of coal, &c."

Anderson, DuPuy & Co.: "We have not yet been inconvenienced, since we use coal in but a portion of our mill, the rest of the fuel being natural gas from our own lines."

Oliver & Roberts Wire Company: "We are using natural gas in nearly all departments for fuel, and expect to be able to run our works until our supply of raw material is exhausted. We have enough steel to last us for several weeks yet, and expect, therefore, to keep our barb wire and nail factories running possibly until July 1, even if the coal strike should continue until that time."

Lockhart Iron & Steel Company: "We have our own gas wells and have not been using any coal. Our operations have not, therefore, been affected by the strike."

Wm. Clark's Son & Co., Solar Iron & Steel Works: "We have suffered no interruption in our manufacture by the coal strike, and expect to have a full supply of fuel."

Sterling Steel Company: "Foreseeing the strike, we laid in a supply of coal and slack which has been sufficient for us and so far our operations have not been curtailed by a scarcity of coal."

Mackintosh, Hemphill & Co., Fort Pitt Foundry: "We have not been interfered with by the coal strike, as we run on gas."

Apollo Iron & Steel Company: "Our operations have not been curtailed any by the coal and coke strikes."

Reliance Steel Casting Company, Limited: "We are using natural gas in all our departments and have not been affected by the coal and coke strikes."

The Carrie Furnace Company: "We have been stopped by the coke strike three weeks to-day, and by this stoppage our production has been curtailed to the extent of 500 tons per day."

Henry W. Oliver, receiver Oliver Iron & Steel Company: "Our Rosena blast furnace at New Castle is banked. We have a good supply of natural gas and a good stock of coal, so that the operations of our mills are so far uninterrupted."

A movement is on foot to build a Bessemer plant and billet mill in Eastern Pennsylvania, as a joint undertaking of a number of rolling mills.

In the course of the debate on the iron ore paragraph in the Senate a letter was read from L. S. Bent, chairman of the Juragua Iron Company, Limited, of Philadelphia, in which he makes the statement that for the year ending De-

cember 31, 1893, the cost of the ore free on board ship at Santiago de Cuba was \$1.14 per gross ton.

### Rolling Black Plates on Sheet Mills.

The question is often asked, Why cannot black plates for tinning be rolled on sheet mills? It can be done on mills designed for making sheets of the lighter gauges that do not exceed 30 inches wide, but there are several reasons why the practice is not followed. The principal one is that the methods of working light sheets of large area are not suitable for making sheets for tinning, which are of much smaller surface and finer finish. Sheet rollers working on the hot finish process have not been educated to the finer work of rolling tin plate, the furnaces and equipment of sheet mills are not adapted for the purpose, and the general results are by no means equal to those obtained on tin mills, neither in the matter of quantity nor quality. Under the present scale of wages and code of rules agreed upon between sheet iron manufacturers and the Amalgamated Association of Iron and Steel Workers, it costs considerably more to roll a gross ton of black plates on a sheet mill than it does on a tin mill. The difference is clearly shown in the following statement:

#### Comparison of Labor Cost.

MAKING NO. 30 GAUGE BLACK PLATES FOR TINNING, SHEET MILLS AND TIN MILLS RESPECTIVELY.

#### Sheet Mill Scale.

1 roller.....	Paid by the gross ton... \$11.88
1 rougher.....	
1 catcher.....	
1 heater.....	
1 shearman.....	
1 sh'rmn helper.	Paid by the day \$6.43 for a possible output not exceeding 2 gross tons.. 3.21
1 pair heater.....	
1 matcher.....	
1 doubler.....	
9 men.....	

Total cost per gross ton..... \$15.09

#### Tin Mill Scale.

1 roller.....	Paid by the gross ton... \$5.30
1 catcher.....	
1 doubler, paid by the gross ton....	
1 heater, paid by the gross ton.....	
1 shearman, \$1 per turn of 2 gross tons.....	.50

5 men.....

Total cost per gross ton..... \$10.98

Difference in favor of tin mills per gross ton..... \$4.11

In the above estimate none but skilled labor is included. General and miscellaneous labor would amount to much more per gross ton on sheet mills than on tin mills. Sheet mills are limited to 135 pairs per turn, which is under no circumstances exceeded. Upon this basis the average output working black plates would be about 3500 pounds. In the estimate above it is given as 4480 pounds (2 gross tons). This quantity could only be made by working plates 28 inches wide, in multiples of 20 inches. On the other hand, there is no limit to output during eight hours on tin mills, and the product often reaches 4750 pounds and is generally 4500 pounds. Exactly the same amount of labor, such as engineers, firemen, foremen, laborers, &c., would be required to handle an output of 3500 pounds through the various processes as would be required to handle 4500 pounds, and the cost per ton would be proportionately larger, and under the same rule it would be more expensive to maintain steam and keep furnaces hot for the smaller production.

From this explanation it will appear to be a wise plan for those who contem-



plate manufacturing black plates to equip their mills specially for this class of work and not attempt to produce them on sheet mills having rolls 38 to 40 inches long in the barrel while better results can be obtained with rolls only 30 inches long.

### The Amalgamated Association.

(By Telegraph.)

After two days devoted to committee work the delegates to the nineteenth annual convention of the Amalgamated Association of Iron and Steel Workers resumed business. On Wednesday the morning was devoted to a consideration of the report of the sub-committee on the sheet iron scale. The reports of the other wage committees will be taken up on Thursday and Friday. The Committee on Good of the Order will recommend a resolution petitioning Congress to restrict immigration. President Garland and Secretary Kilgallon pronounce as bogus the dispatch telegraphed to Eastern papers purporting to give the scale adopted by the convention. President Garland will on Friday appoint a committee of fifteen to submit the scale as adopted by the convention to the manufacturers. The officers of the association assure *The Iron Age* correspondent that the changes from last year's scale are few and trifling. No definite information regarding it, however, will be made public until it has been presented to the manufacturers. The committees on grievances, constitution and mileage are still at work and the convention will not adjourn before Friday or Saturday of this week. One of the pleasant features of the convention was an address by Secretary Evans of the Federation of Labor. He congratulated the association upon its unity and prophesied victory for the miners when they would lay aside the district plan and take up the national plan of the association. About 150 delegates are still in attendance.

The condition of affairs in the iron trade of Ohio has not been changed during the past week. All hopes of an immediate settlement of the coal miners' strike are dispelled and still greater efforts are being made by the miners to prevent foreign coal from passing over Ohio railroads. Along the line of the Cleveland, Lorain & Wheeling Railroad efforts have been made to burn down bridges and thus prevent transportation, but they have in every instance failed, as also have intimidations of the train crews. Several trains pass along the road each day loaded with coal from West Virginia, but local manufacturers are not able to pay the price asked for it (\$2.80 per ton), and it is taken to lake ports. The Toledo & Ohio Central Railroad also had a good share of traffic, and raised the rate 60 cents per ton to cover the expense of guards along the line, but notwithstanding this protection the lives of trainmen were endangered to such an extent that the trade was abandoned. Rolling mills and other manufacturing are idle, and there is no ray of hope for an early resumption of operations.

## MANUFACTURING.

### Iron and Steel.

The Bellaire Nail Works, Bellaire, Ohio, manufacturers of Bessemer pig iron and billets, will erect an additional blast furnace during the present year. The contract for its construction has been placed with McClure & Amsler, engineers and contractors, of Pittsburgh, and the work of erecting it will be pushed as rapidly as possible and an effort will be made to have the furnace ready for blast early next year. The size of the new furnace will be 18 feet bosh with stack 75 feet in height. It will be equipped with four Massick's and Crooke's hot blast stoves 18 x 65 feet. After completion of this furnace it is the intention of the Bellaire Nail Works to keep in blast two furnaces, as it will take the output of both stacks to keep their steel works supplied with Bessemer pig iron. This firm also expect to build a new foundry and machine shop and have under consideration improvements at their Bessemer steel plant which may or may not be made during the coming summer.

Concerning the strike at the plant of the National Tube Works Company, McKeesport, Pa., reference to which was made in our issue of last week, we have the following official advice: On Monday, the 14th inst., at 1.30 p. m., the men and boys in the butt weld and lap weld departments of our mill left their work without any warning, and by evening our entire works were shut down. We had received no intimation of any trouble. No demand had been made by the men, and we had no knowledge of any grievance on their part. On Tuesday afternoon following a committee of the strikers waited upon us, demanding that their wages be advanced 10 to 12 per cent., being an equivalent of a reduction made in February last. We declined to accede to same, and they have decided to stay out. Although the strike did not extend beyond the departments referred to above, yet we were obliged to shut down all our rolling mill departments, as we had no use for the product. Everything is shut down at present, and 6000 men are thrown out of employment. It will be impossible for us in such times as the present to pay any advance in wages without entailing a severe loss upon ourselves. We are, therefore, compelled to take the above action. Whenever the men are ready to return at old wages, we will start up our works. In the mean time, our Western department at Kewanee, Ill., which has only been running one-third time prior to this week, will now be put on full time. The output of that department, together with the heavy and well assorted stock in our various warehouses, will be ample to supply the requirements of our trade.

The Wetherald Rolling Mill, which was removed from Findlay, Ohio, to Frankton, Ind., has now been in operation a little over three months in its new location and is doing very good work for its capacity and equipment. It is located in the heart of the Indiana natural gas belt. The mill has five scrapping and three puddling furnaces, three heating furnaces, a 20-inch muck train and two finishing trains of rolls, one 10 and one 8 inch. It is operated by the Northwestern Iron & Metal Company, Room 414 The Rookery, Chicago.

The tube works at Cohoes, N. Y., were forced to discontinue operations Friday, May 18, on account of the impossibility of getting fuel, caused by the coal strike.

The forging hammer, the 18-inch train and the Belgian train at the Albany Iron Works, Troy, N. Y., are in operation.

The 14 and 20 inch trains are at work in the merchant mill of the Burden Iron Works, Troy, N. Y. Train 3 of the puddling forge at the steam mill and eight furnaces are idle.

A slight fire occurred recently in the J. & J. Rogers machine shop, at Ausable Forks, N. Y. The prompt action of the fire department prevented great damage.

The Pittsburgh Wire Company of Pittsburgh, with works at Braddock, Pa., manufacturers of copper and steel wire rods and wire, on May 9 broke the record for rolling wire rods as against the same class of mill in a turn of ten hours. On the above date the output was 260,090 pounds. We are advised that the report that the plant of this concern has been closed down on account of the coal strike is untrue. The works are in full operation and a plentiful supply of fuel is being secured right along.

We are advised that the statement that Wayne Iron & Steel Works of Brown & Co., Incorporated, Pittsburgh, have been put on double turn in all departments is untrue. The plant is on single turn, and on account of insufficient orders it is sometimes necessary to close down for two or three days during the week.

The Stewart Iron Company, Limited, Sharon, Pa., manufacturers of pig iron, muck bar, blooms and coke, last week signed the wage scale of the Amalgamated Association calling for \$4 per ton for boiling, the scale to be in force until June 30 next, after which time the scale is void and the signing of no effect. The firm have orders for a moderate amount of muck bar and will work seven furnaces, six heats per day. When these orders have been filled the plant will be closed down unless additional orders are secured in the meantime.

The tin plate department now under erection by the Etna-Standard Iron & Steel Company, Bridgeport, Ohio, is expected to be ready for operation about June 1 next.

The Hess Spring & Axle Company of Carthage, Ohio, have been chartered with a capital of \$10,000 for the purpose of manufacturing and selling vehicle springs and axles. Alfred Hess, Elmer J. Hess and W. C. McCall are among the incorporators. The new firm advise us that they have considerable orders on hand and are operating their works full time.

The statement published in the Pittsburgh papers last week to the effect that the plant of the Duquesne Tube Works Company, at Duquesne, Pa., had been closed down on account of a demand of the employees for an increase in wages is untrue. Their men have made no request for an advance in wages and their plant is running as usual. However, on account of a shortage of fuel and skelp, most of the skelp mills being closed down, the plant will be operated to a limited extent only, depending upon what supplies of fuel and material can be obtained.

Last week Furnaces H and B of the Edgar Thomson Steel Works, Bessemer, Pa., were blown out and Furnace I was banked on account of the coke strike. The two stacks first named will be remodeled and repaired and will be idle for three or four months.

It is stated that the shipments from the Homestead Steel Works, Homestead, Pa., now average about 95 cars of material per day. Last week an ingot weighing 48½ tons was rolled in the 32-inch mill.

The report that the plant of the Consolidated Steel & Wire Company of Pittsburgh, Pa., with works at Duquesne, Pa., had been closed down on account of the coal strike is without foundation. This plant is being operated full time and so far the firm have been able to secure a plentiful supply of fuel.

Last week executions amounting to \$8477 were issued against the McKinley Tin Plate Company of Wilkinsburg, Pa. The concern were chartered on June 8, 1892, with a capital stock of \$50,000. The charter members of the company are: L. H. Smith, 240 shares; E. S. Wangenheim, 240 shares; H. Y. Haus, 2 shares; S. W. Cunningham, 2 shares; Richard B. Scandritt, 2 shares. Since the organization some Pittsburgh parties have also taken stock. The firm have not as yet made an assignment, but judgment has been confessed to E. S. Wangenheim, one of the largest stockholders, in order to protect the company and their creditors. The assets are placed at \$15,000 and the liabilities at about the same amount.

Some extensive improvements are being made in the rod mills of the Beaver Falls Mills, Beaver Falls, Pa.

Last week the Bessemer steel plant of the Bellaire Nail Works, Bellaire, Ohio, the Wheeling Steel & Iron Company, Wheeling, W. Va., were in operation.

The Bessemer department at the South works of the Lackawanna Iron & Steel Company, Scranton, Pa., have broken their former weekly record, making for the week ending May 12, 1894, 705 tons ingots, running 11 turns. This is the largest product ever made at this plant, though it is claimed the capacity has not yet been reached. They are increasing production steadily, and soon expect to make a weekly average of 6000 tons.

The establishment of a blast furnace at St. John, N. B., is being agitated. R. G. Leckie is interested in the project.

Fires were kindled in the Dora Furnace, at Pulaski, Va., Thursday last, and the new



foundry, built to utilize a portion of the output of the furnace, put in operation.

The Bessemer department of the American Steel Casting Company, at Alliance, Ohio, has closed down indefinitely, owing, it is stated, to lack of orders.

J. J. Mohr of Philadelphia, who as trustee operated the Sheridan furnaces, at Sheridan, Pa., for a time, has retired. The furnaces are now in charge of the Sheridan Iron Company, recently organized at Burlington, N. J. Charles Forney will continue as manager.

The Round Mountain Furnace, at Round Mountain, Ala., is now running on full time. The Chattanooga Southern is building a branch to the furnaces and mines.

The structural material for rebuilding the Whitaker mill at Wheeling, W. Va., is being received, and the work of erection will be pushed forward as rapidly as possible.

The Lukens Iron & Steel Company of Coatesville, Pa., have begun preparations for the erection of two new open hearth furnaces.

J. Wood & Bros. Company's rolling mill, at Conshohocken, Pa., was flooded with water during the recent heavy rainfall, and sheet iron to the value of \$50,000 was more or less damaged.

Pottstown, Pa., and the adjacent territory sustained considerable damage by the heavy rains of the last few days. The Glasgow Iron Company's works, north of the town, and their Valley Mill, west of the town, were flooded and closed down. The Ellis & Lessig Steel & Iron Company, west of town, started their nail works on Monday, but were compelled to stop in a couple of hours. The furnace of the Warwick Iron Company was banked up, because of 4 or 5 feet of water in the stock house, so that the filling could not be done.

#### Machinery.

Boys, Porter & Co. of Connellsville, Pa., manufacturers of Yough steam pumps, coke works and furnace supplies, are operating their works to nearly full capacity and report the outlook for the future as very encouraging. The same is true of the Connellsville Machine & Car Company, at the same place.

Ireland & Hughes of Pittsburgh, manufacturers of oil well tools, are operating their works to nearly full capacity and report prospects for the future as being very bright.

The Westinghouse Machine Company of Pittsburgh are running their large plant full time on single turn. A large number of employees who were laid off during the severe depression have been taken back by this concern.

R. H. Brown & Co., New Haven, Conn., are now constructing an addition to their factory of 163 x 40 feet. It is high basement and one story. The floor between basement and first story is fire proof, no wood whatever being used. They are also constructing a fire proof vault for gauges, special tools, &c.; dimensions, 27 x 24 feet on a level to the first story. They will be able to store the above mentioned articles and transport them with hand trucks about the different departments without change.

The plant of the Watrous Engine Works Company, at South Park, Minn., was completely destroyed by fire on the 11th inst. The company are manufacturers of steam fire engines and fire department apparatus and have been very successful in building up a good business. The plant was valued at \$60,000. It will be rebuilt.

The Edison General Electric Company are centering their entire manufacturing industry at Schenectady, N. Y. The removal of the Thomson-Houston plant from Lynn, Mass., is now under way and the machinery is being transferred. The Schuyler plant, at Middletown, Conn., has already been removed, with about 1000 hands. The Brush Company, at Cleveland, employing 2000 hands, are to be removed. The centralization of all these will necessitate the erection of more shops at the General Electric plant and plans for these have already been drafted. The company have also received an order for 500 street car motors.

At the annual meeting of the Consolidated Car Heating Company of Albany, N. Y., June 5, a proposition is to be presented to increase the scope of the concern's manufacturing business, so as to include a general business in making and selling rail-

way supplies or apparatus, and in equipping cars and railways therewith, and in making and selling electrical appliances generally.

The Acme Machinery Company, Cleveland, Ohio, are in receipt of a number of foreign orders, which they trace to their World's Fair exhibit. From Valparaiso, Chili, they have an order for a large heading machine, and they are now filling a contract for two bolt cutting machines for the Hungarian State Railroad at Budapest.

The entire plant of the Climax Road Machine Company, at Marathon, N. Y., was destroyed by fire May 16. The loss is \$25,000, covered by an insurance of \$11,000. Sixty men were employed at the works.

The machine shop and building of Cross & Sons, at Seneca Falls, N. Y., were destroyed by fire May 14. The firm had repaired the building and placed new machinery in it within the past two years and were having success as iron and wood workers. There was only \$1400 insurance.

A charter has been granted to the Pennsylvania Furnace & Casting Company, Pittsburgh, with the following directors: James Riley, Paul N. Decrette of Pittsburgh, and Geo. W. Flowers of Irwin, Pa.

The Lodge & Shipley Machine Tool Company of Cincinnati, Ohio, recently made a test of their 30-inch double saddle turret lathe, turning the diameter, squaring down the rims on both sides and boring a cast steel blank 23 inches diameter,  $4\frac{1}{2}$ -inch face,  $3\frac{3}{4}$  inch bore, hub  $7\frac{1}{2}$  inches long, in 45 minutes, including chucking and unchucking. This is a good day's work for a powerful engine late. This machine is guaranteed to turn out ten such pieces in ten hours.

The A. B. Pitkin Machinery Company of Boston, Mass., and Providence, R. I., have purchased at assignee's sale the entire plant formerly used by Parker, Field & Mitchell, and now offer the tools in lots to suit purchasers.

At East Boston, Mass., the boiler makers employed by E. Hodge & Co. went on strike because the firm refused to discharge an employee who was obnoxious to them. The strike is still on.

The Naugatuck Malleable Iron Company are to build a new annealing room, 95 x 170 feet, at the north end of their property at Union City, Conn.

Geo. M. Clapp, dealer in engines, boilers and machinery at 74 Cortlandt street, New York, is carrying a large stock of engines, particularly of the Corliss type. He notes an improvement in the number of inquiries lately, indicating that users are considering more power even in the face of dull times.

W. O. Atwood of the Atwood Machine Company, Stonington, Conn., is about to leave for Russia, to superintend the erection of machinery recently sold by his company to parties in Moscow.

The Fred. M. Prescott Steam Pump Company have been incorporated, with a capital stock of \$30,000, by Albert L. Osborne, George H. Abeel and James A. Latta of Buffalo County, Wis. The principal office of the company will be located in Milwaukee.

Martin E. Davis of Des Moines, Iowa, has recently organized a company with \$500,000 capital, \$150,000 of which is paid up, to manufacture the Whiting modern automatic oiling devices for all kinds of machinery.

The Foster Machine Company of Westfield, Mass., will try the profit sharing system during the coming summer.

D. B. Cruickshank has opened an office in the Butler Exchange, Providence, R. I., for the purpose of carrying on the business of consulting engineer and dealer in machinery and supplies of all descriptions.

Jones' machine shop, at Wilkes-Barre, Pa., has been burned at a loss of \$2000.

The Detroit Foundry Equipment Company have arranged for the removal of their plant from Detroit, Mich., to Harvey, Ill. The works employ about 75 men in the manufacture of cranes and foundry equipments.

Reports in the daily newspapers are to the effect that New York and Boston capitalists have perfected arrangements for the purchase of the Corliss Steam Engine Company's works, at Providence, R. I. The report states that since the death of Mr. Corliss his heirs have let the plant deteriorate, and a year ago the company refused to take

orders for engines. For more than a year 100 men only have been employed, but the sale of the plant will mean the reopening of it in its entirety and the employment of 700 men.

#### Hardware.

National Tubular Axle Company, Emigsville, Pa., report an increasing trade, particularly with farmers and users of wagons.

The annual meeting of the John Torrey Mfg. Company, Portsmouth, N. H., was held on the 14th inst. The report of the treasurer showed the company to be in a flourishing condition. The following directors were chosen for the ensuing year: Charles A. Sinclair, Thomas E. Cail, John Torrey, W. J. Dudley, Edward D. Coffin, Daniel E. Leavitt and Joseph O. Hobbs. It is the intention of the company to double the capacity of their factory in the near future.

The Whitney Hammerless Gun Company of Hartford, Conn., are negotiating for the establishment of their plant at New London. The capital of the company is \$150,000.

Hussey, Binns & Co. of Pittsburgh, with works at Charleroi, Pa., manufacturers of shovels, spades and scoops, are running their works full time, and have more orders on hand now than at any time since last July.

Black Flag Stove Polish Company, Syracuse, N. Y., advise us that business has been better than they expected, the company not having shut down at all this winter or spring.

D. C. Hadcock of Valley Mills, Madison County, N. Y., is in correspondence with Utica, N. Y., capitalists in regard to establishing a plant for the manufacture of a newly patented steel trap, said to have some excellent new features. It is proposed to start a factory in Utica employing from 100 to 150 hands.

The hammer handle works of John Young, at Charlton, N. Y., were destroyed by fire Thursday, May 17. The loss is \$2500.

#### Miscellaneous.

The Kelly & Jones Company of Pittsburgh, with works at Huff Station, Greensburg, Pa., manufacturers of plumbers' and gas fitters' supplies, are operating their plant double turn in nearly all departments and are giving employment to about 500 men.

The Girard Stove Company, Girard, Ohio, are contemplating the removal of their plant to some other locality. Youngstown has been favorably mentioned, but as yet no decision has been reached. If the plant is removed it is the intention to make a single plant of the two present foundries, and to do this a new and larger site will have to be secured than is now occupied.

At Pittsburgh last week a continuance was granted to the next term of the courts in the case of the Denver Consolidated Electric Company of Denver, Col., against the Standard Underground Cable Company of Pittsburgh. The suit is for \$52,490.88 damages caused, it is alleged, by the defendant company laying cables of an inferior character for electric lighting for the plaintiff.

The masonry on the new aluminum works of the Pittsburgh Reduction Company, at Niagara Falls, N. Y., will be completed in a few days. Then the iron work will be started at once. The Reduction Company will use 6000 horse-power from the electrical plant of the great falls tunnel.

It is reported that the New York Central & Hudson River Railroad Company are to purchase the Gilbert Car Company's works, at Green Island, N. Y., for \$500,000, to be used as a construction and repair shop for the Delaware & Hudson Railroad.

The Champion Iron Company of Kenton, Ohio, have been awarded a \$6000 contract for the ornamental iron work on the court house at Toledo.

The Gulf Shore Railroad Company have agreed to locate their main shops and offices at San Antonio, Texas, in consideration of the local stock subscription of \$58,000.

Arrangements have been made and capital stock to the amount of \$40,000 has been subscribed for the establishment of a brass factory at Winsted, Conn.

Begiebing & Butell, proprietors of the Des Moines Plow Factory, at Des Moines, Iowa, have arranged for the erection of additional buildings and the introduction of more machinery which will increase their manufacturing facilities threefold.

## The Iron and Metal Trades.

From Cleveland comes the news that lately quite a considerable quantity of Mesaba Ore from the Rockefeller interests has been placed at old figures, and that now sellers generally ask a slight advance.

The question of future increased cost is attracting growing attention among Western producers, and it is coupled with the fear that further labor troubles may develop. There is some uneasiness concerning the Lake Ore miners, and considerable uncertainty about the result of the coming negotiations between the Amalgamated Association and the union mills. As our correspondent in Cleveland telegraphs, the scales to be presented by the former will be a repetition of last year's demands. If that proves to be true there will be trouble. Another feature is the withdrawal of the lower freight rates on crude and finished product, which is apparently becoming general north of the Ohio and Potomac rivers.

An increasing number of mills have been forced into idleness through the Coal and Coke strikes, and the floods have interfered with the operations of others. The summary of the condition of the Pittsburgh works which we print elsewhere shows, however, how largely the plants in that district have succeeded in tiding over the trouble.

The feeling is growing general that active operations will soon begin in the Connellsville Coke region. Two of the Pittsburgh blast furnaces are getting ready to start next week. There is a growing conviction, too, that the decisive moment is coming in the Coal strike, and that work will be resumed at no distant date. But even if operations are again started it will take some time before the Coal trade settles down into its regular grooves.

Transactions in Bessemer Pig in the West have been light. In the East several round blocks were taken, but the immediate pressure seems to be over. In Steel the scarcity of spot stock is still great, but the demand is light, and the high quotations named for prompt delivery are really only nominal.

In Finished Iron and Steel the demand continues light and the supply is so fair that only a moderate advance has been established in Western markets, while better prices are obtained by Eastern sellers only when customers must have the material at once. What new specifications come up for later delivery are taken at prices very close to those of the days before the strike.

No movement upward has taken place in Foundry Iron, although the growing scarcity of Southern Pig is bringing the situation very close to an actual advance.

## Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., May 22, 1894.

There is nothing to report in the way of new business, neither buyer nor seller being inclined to enter into new engagements until there is something definite in regard to the fuel supply. There is no very satisfactory evidence of any large demand, even if the coal supply was assured, so that there is not much worrying about the shortage, although in the mean while it has taken several mills out of the market, and to that extent has helped prices, particularly in Plates and Shapes. There is an undercurrent of feeling, however, that a reaction would follow a settlement of the wages question, and as there is an impression that that is near at hand prices are firm only on spot lots or quick deliveries. For long deliveries buyers are not inclined to consider any such prices as are quoted for spot, and as a matter of fact the right kind of bids would attract attention at very liberal concessions, in one instance a difference of \$1 7/8 ton having been quoted on Billets between the first half of June and the three following months. The weak feature is the indifference of large buyers. Small lots are easily placed at full prices, but there is nothing to indicate any great scarcity, or, to be more exact, any general desire to buy. The extraordinary weather of the past few days will stop quite a number of mills in the Susquehanna and Schuylkill districts, and will further add to the complications, but with all this in prospect there appears to be no scarcity that cannot be met at a price, and as regards Iron, a very slight advance is all that can be realized, a half tenth or at most a full tenth on the very best makes. Finished Steel is probably a half tenth to a tenth dearer than it was a week ago, but, as already stated, limited quantities and quick deliveries are essential features, when a premium of that kind is exacted.

**Pig Iron.**—The two prominent features of the week have been a scarcity in low grade Irons and a lighter demand for other descriptions. At \$10 @ \$10.25, delivered, a good deal of Iron would be taken; at \$10.50 and upward buyers begin to pick and choose. As a rule holders claim to have firmer ideas, and while there is plenty of Iron at \$10.50 @ \$10.75 for Mill and Pipe purposes, it is not easy to force concessions, and the same may be said of No. 2 X at \$11.50 @ \$11.75, although, as usual, chance lots at less money are met with once in a while. Holders base their ideas on better prices—1, because of the tremendous cutting down in the output; 2, on the probability of higher cost of production during the summer months, and, 3, because of the advance in freights which is scheduled for June 20. Buyers do not respond to these ideas, however, so that it is for the future to determine what the outcome will be. There is nothing doing in Bessemer, although \$14 and upward could probably be realized if spot or June deliveries could be guaranteed; later dates, \$12.50 @ \$13. General quotations for Philadelphia and equivalent points are about as follows:

Bessemer, spot.	\$14.00 @ \$14.50
Bessemer, July, August and September.	12.50 @ 13.00
Standard No. 1 Foundry X.	12.50 @ 12.75
Standard No. 2 Foundry X.	11.25 @ 11.75
No. 2 Plain.	10.75 @ 11.00
No. 1 Soft.	11.50 @ 11.75
No. 2 Soft.	10.75 @ 11.00
Standard Gray Forge.	10.50 @ 10.75
Ordinary.	10.25 @ 10.50

**Steel Billets.**—In the absence of actual business prices are nearly what sellers ask, nominally \$19.70, delivered. In some quarters intimations are made that bids of \$19 @ \$19.25 would receive consideration, but those who have fuel have Billets to match, and without the former there is no use for the latter; hence an utter indifference in regard to new business until the Coal strike is settled.

**Finished Material.**—The local demand has been very satisfactory, although there is nothing to show that it is anything more than a temporary scarcity due to the enforced suspension of work at quite a large number of mills. Of course, there can be no reaction until the coal strike is settled, but there are indications that large consumers are not following the market to any great extent, although sales are reported at from 1.30¢ to 1.40¢ for prompt deliveries of Tank and Bridge Plate, with similar quotations on Structural Material, but all depends on the urgency for delivery. For the time being sellers have control of the market, but as already mentioned it is only for prompt shipments. General quotations are about as follows, delivered:

Grooved Skelp, delivered.	1.20¢ @ 1.25¢
Standard Refined Bars	1.30¢ @ 1.40¢
Medium quality.	1.15¢ @ 1.20¢
Tank Steel.	1.25¢ @ 1.35¢
Heavy Plates.	1.30¢ @ 1.40¢
Shell.	1.40¢ @ 1.50¢
Flange.	1.60¢ @ 1.80¢
Angles.	1.20¢ @ 1.30¢
Beams and Channels.	1.40¢ @ 1.60¢

**Old Material.**—Consumption is so restricted that there is very little new business, but prices are unchanged and usually quoted as follows, delivered:

Heavy Melting Steel.	\$10.00 @ \$11.00
Light Melting Steel.	8.00 @ 9.00
No. 1 Wrought Scrap.	10.00 @ 11.00
Machinery Cast.	9.50 @ 10.00
Wrought Turnings.	8.00 @ 8.50
Cast Borings.	6.00 @ 6.50
Old Iron Rails.	12.00 @ 12.50

## Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street, CHICAGO, May 23, 1894.

The Coal famine has grown worse during the week and stocks of Anthracite are beginning to be drawn upon by consumers of Soft Coal. Prices of Iron and Steel continue to harden, but buyers are not yet being scared into loading up at the higher rates. It will take some time for them to make up their minds that higher prices have come to stay, which now appears likely. Even if the Coal strike is speedily settled it will be so close to July 1 when new supplies of fuel come into the market that the labor troubles in the rolling mills, now expected, will continue to restrict production and may maintain throughout the summer the advances which have thus far been made.

**Pig Iron.**—Business seems to be improving considerably. Dealers have grown so much in the habit of reporting trade quiet that they do not perhaps appreciate themselves the better buying which has recently developed. Local Iron appears to be in very good demand, comparatively speaking. Shipping instructions are coming in at a lively rate on old contracts and new orders have been entered quite freely during the week. Negotiations are now pending for considerable quantities which are expected to be closed soon and will make the coming week a good one. Agents of Southern companies

generally report business quiet, but it is known that orders ranging from 200 to 400 tons each have been placed and that one house in this way sold about 1500 tons since last report. Southern Soft Irons are now very scarce and the Silvery grade is practically out of the market. Foundries are running short of Coke, but every effort is being made to have them supplied and it is not expected that they will suffer seriously before the Coke strike ends. Sales of fair sized quantities of Lake Superior Charcoal have recently been made at our quotations. The Iroquois Furnace is now banked for lack of Coke. The company, however, have enough Iron on hand to supply their trade for 30 days except perhaps on one or two grades. Quotations are given as follows for cash:

Lake Superior Charcoal.....	\$15.00 @	\$15.50
Local Coke Foundry, No. 1.....	11.25 @	11.50
Local Coke Foundry, No. 2.....	10.50 @	11.00
Local Coke Foundry, No. 3.....	10.00 @	10.50
Local Scotch.....	11.50 @	11.75
Ohio Strong Softeners No. 1.....	12.80 @	13.50
Southern Silvery, No. 1.....	..... @	11.50
Southern Silvery, No. 2.....	..... @	11.00
Southern Coke, No. 2.....	10.00 @	10.35
Southern Coke, No. 3.....	9.75 @	10.00
Southern, No. 1, Soft.....	10.25 @	10.50
Southern, No. 2, Soft.....	10.00 @	10.25
Tennessee Charcoal, No. 1.....	15.00 @	15.50
Tennessee Charcoal, No. 2.....	14.50 @	15.00
Alabama Car Wheel.....	17.85 @	18.00
Jackson County Silvery.....	15.00 @	16.00
Coke Bessemer.....	12.00 @	.....
Other Ohio Silvery.....	12.50 @	13.00

**Bars.**—The market continues to show improvement. Orders are coming in most freely from general consumers, and inquiries are frequent for long deliveries and for bids on seasoned contracts. Manufacturers, however, are not eager to quote on deliveries to run very far into the future at anything like present prices. The chances of dearer raw material are too great for them to take the risk. The Youngstown mills have been able to maintain the advance recently made and report actual sales on the basis of 1.05¢ at mill for Common Iron. Mill shipments, Chicago delivery, are generally quoted at 1.10¢ @ 1.15¢ for Common Bar Iron and 1.25¢ @ 1.30¢ for Soft Steel Bars. Jobbers report their customers holding off until prices settle, but quotations for small lots have been advanced to 1.25¢ upward for Bar Iron and 1.40¢ upward for Soft Steel Bars, according to quantity.

**Structural Material.**—The Variety Iron Works of Cleveland have taken the contract for the erection of the Galena, a new 12-story office structure. A brisk business is reported in small lots of Beams and Angles from stock. One large concern is refusing to take orders for mill shipments of Beams. Orders are now being filled here from a wide range of territory. Bridge work is quiet. Quotations on mill shipments, Chicago delivery, are as follows: Beams and Channels, 1.45¢; Tees, 1.60¢; Angles, 1.40¢; Universal Plates, 1.45¢. Small lots from stock sell at 1.70¢ @ 1.85¢ for Beams, 1.50¢ @ 1.60¢ for Angles, and 1.70¢ @ 1.80¢ for Tees.

**Plates.**—Manufacturers' agents report very little new business. Local buyers are probably timid and will wait for some time before buying at the advanced prices now asked. Mill shipments, Chicago delivery, are quoted as follows: Tank Steel, 1.45¢ @ 1.50¢; Flange Steel, 1.65¢ @ 2.10¢; Fire Box, 2.50¢ @ 5¢. Dealers are disposed to be stiff. They are not inclined to take any large amount of business, but are carrying the small trade. Store prices are as follows: Iron or Steel Sheets, Nos. 10 to 14, 1.80¢ @ 1.90¢; Tank Steel, 1.60¢ @ 1.85¢; Flange Steel, 2.10¢ @ 2.35¢; Boiler Tubes, 75 % off.

**Sheets.**—Inquiries are large and a general rush is in progress to cover requirements for the summer and fall months, but the number of sellers has diminished decidedly and a general stiffening in prices has taken place, which, however, is particularly noticeable among the very lowest sellers. The quotations on mill shipments of No. 27 Common Stove Pipe Iron, Chicago delivery, are now 2.40¢ @ 2.45¢, with small lots selling from stock at 2.65¢ @ 2.75¢. Galvanized Iron is quotable at 77½ % discount on mill shipments. Here and there a manufacturer is endeavoring to get the same price on mill shipments quoted by jobbers on small lots. Sheet Copper is unchanged at 14¢, with no discount.

**Merchant Steel.**—Nothing new has transpired under this head except that prices are very firm with the advancing tendency in raw material. The carload trade is fair. We quote mill shipments, Chicago delivery: Smooth Finished Machinery and Tire, 1.70¢ @ 1.80¢; Open Hearth Spring Steel, 1.85¢ @ 1.90¢; Bessemer Machinery, 1.55¢ @ 1.60¢; Bessemer Tire, 1.40¢; Ordinary Tool Steel, 6¢ @ 7¢; Specials, 12¢ and upward.

**Billets and Rods.**—Numerous inquiries have been received here for both Billets and Rods from consumers who usually buy from Pittsburgh manufacturers. Inquiries are also coming in from nearby concerns in need of considerable material to cover their requirements. Prices may now be quoted at \$19.50 @ \$20 for Billets and \$26 for Rods.

**Rails and Track Supplies.**—A steady stream of small orders for Steel Rails is reported and inquiries are good for future shipments. Prices are: \$25 @ \$27 for Standard Steel Rails; 1.35¢ @ 1.40¢ for Steel Splice Bars; 2.15¢ @ 2.25¢ for Track Bolts, with Nuts; 1.60¢ @ 1.70¢ for Spikes, and 1.60¢ for Links and Pins.

**Old Rails and Car Wheels.**—No business has transpired in Old Iron Rails, and quotations are continued nominally at \$10, Chicago. The best offer for short pieces of selected Old Steel Rails during the week was equivalent to \$6.60, Chicago. Selected long lengths are quoted at \$9.50 @ \$10. Old Car Wheels are quiet; quotations are nominally \$10 @ \$10.50.

**Scrap.**—No movement has yet taken place in Steel Scrap, notwithstanding the advance in Bessemer Pig Iron at Pittsburgh, which has been anxiously expected to lead to such a demand here. Other classes of Old Material are very quiet. Dealers quote the following selling prices @ net ton: Railroad Forge, \$9; Dealers' Forge, \$8 @ \$8.50; No. 1 Mill, \$6.50; Pipes and Fines, \$6; Heavy Cast, \$7 @ \$7.50; Stove Plate, \$5 @ \$5.50; Fish Plates, \$10; Horseshoes, \$9; Mixed Steel, gross ton, \$5.

**Metals.**—Carload lots of Lake Copper are still quoted at 10¢ and casting brands 9.25¢. Spelter has eased off to 3.25¢ for prime Western brands, while Pig Lead is quoted at 3.20¢ @ 3.25¢.

In a recent test at the Sandy Hook proving grounds two Midvale-Holtzer steel projectiles penetrated a 9-inch oil tempered and annealed plate furnished by the Bethlehem Steel Company, and on being recovered they were found entirely uninjured.

## St. Louis.

(By Telegraph.)

Office of The Iron Age,  
Bank of Commerce Building,  
St. Louis, May 23, 1894.

The Coal strike is the main feature of the general markets. Coal is scarcer than ever and can only be had by paying exorbitant prices. A number of large concerns are making arrangements to use oil, and unless the strike is soon declared off others will be compelled to close down entirely.

**Pig Iron.**—A strong feeling prevails in this department. Stocks have been allowed to run down to a point which will take only a moderate demand to clean up entirely, and as a number of furnaces have closed down the conditions are ripe for a steady improvement in prices. Quotations have been advanced 25¢ @ ton and offers for future delivery are not being sought after. Sales during the week show decided improvement over the preceding week, and the market is in better shape than it has been for months. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry.....	\$11.00 @	\$11.25
Southern Coke, No. 2 Foundry.....	10.00 @	10.25
Southern Coke, No. 3 Foundry.....	9.75 @	10.00
Southern Gray Forge.....	9.25 @	9.50
Southern Car Wheel.....	17.00 @	18.00
Lake Superior Car Wheel.....	16.25 @	16.50
Ohio Softeners.....	14.25 @	14.50

**Bar Iron.**—The current quotation from mills of 1¢ has been withdrawn, and 1.10¢ is now bottom. It is doubtful if an order for a 100-ton lot would be accepted at this price, as mills have practically withdrawn all quotations, and agents are now required to submit all business to the mills before accepting. Jobbers have advanced their price to 1.30¢, at which figure a large business has been done.

**Barb Wire.**—The season for Barb Wire is practically over, and there is little or no demand worth speaking of. Painted is quoted at \$1.80 for carload lots from mill; Galvanized at 40¢ @ hundredweight additional. There are rumors current that a Barb Wire combination has been perfected and that prices are likely to be advanced. At this writing nothing definite can be learned in this direction.

**Wire Nails.**—In pursuance with the agreement entered into by the manufacturers of Wire Nails at Pittsburgh last week, local mills have advanced the price of Wire Nails to \$1.20 @ keg. The demand for Rods is heavy and the demand comes at a time when there is practically none to be had even at good stiff prices. Jobbers report an excellent demand and quote \$1.25 @ \$1.30, according to quantity.

**Rails and Track Supplies.**—There is some improvement to be noted in this department. Railroads are beginning to order more freely and the Car shops report a good inquiry for Cars. We quote as follows: Splice Bars, 1.30¢ @ 1.35¢; Spikes, 1.70¢ @ 1.75¢; Bolts, Square Nuts, 2¢ @ 2.05¢; with Hexagon Nuts, 2.10¢ @ 2.15¢; Steel Links and Pins, 1.60¢ @ 1.65¢; Iron, 1.75¢; Old Rails are quoted at \$10, while Steel Rails are \$26 @ \$27.

**Pig Lead.**—At 3.12¢ @ 3.15¢ this metal seems to be stationary. There is no great amount of business doing, but the market is not as weak as last reported. The demand runs largely to carload orders.

**Spelter.**—The market has settled down to 3 15¢ and seems to be resting firmly at that price. There is an improvement in the demand which bids fair to make itself felt in the matter of advancing the price. The outlook for Spelter can be called encouraging.

## Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts.,  
CINCINNATI, May 23, 1894.

While there has been only a light volume of business during the week the undertone of the market at the close is stronger. There is more demand for Pig Iron than can be readily supplied, and while sellers have not been disposed to ask higher prices they find at the close that buyers would pay a small advance if they could thereby secure the prompt delivery of the Iron, but so difficult is it to buy Southern Coke Iron that until further developments any advance is not quotable. There has been rather more than the usual proportion of Southern Charcoal Iron selling, but, of course, the quantity is not large. There have been some small orders from the East, but the distribution of Iron in this district has been fairly liberal, considering the moderate quantity available. The main consumers of Iron are the Agricultural works, the Stove works and the Cast Pipe works, but the jobbing foundries in the aggregate are melting considerable Pig Iron, but not much in any individual instance. Of course, the Coal strike dominates the whole situation and greatly restricts trade. Quotations are unchanged, but are scarcely more than nominal, as follows:

### Foundry.

Southern Coke, No. 1.....	\$10.25 @ \$10.40
Southern Coke, No. 2.....	9.25 @ 9.50
Southern Coke, No. 3.....	8.75 @ 9.00
Ohio Soft Stone Coal, No. 1....	14.50 @ 15.50
Ohio Soft Stone Coal, No. 2....	14.00 @ 14.50
Lake Superior Coke, No. 1.....	12.50 @ 13.00
Lake Superior Coke, No. 2.....	11.50 @ 12.00
Hanging Rock Charcoal, No. 1..	17.00 @ 17.50
Hanging Rock Charcoal, No. 2..	16.50 @ 17.00
Tennessee Charcoal, No. 1.....	13.00 @ 13.50
Tennessee Charcoal, No. 2.....	12.00 @ 12.50

### Car Wheel and Malleable Irons.

Standard Southern Car Wheel	16.25 @ 17.00
Lake Superior Car Wheel and Malleable.....	16.25 @ 16.75

### Forge.

Gray Forge.....	8.50 @ 8.75
Mottled Coke.....	8.25 @ 8.50

## Financial.

The heavy export movement of gold has continued unabated during the week under review, and the refusal of the city banks to furnish exporters with the metal has thrown the whole strain upon the Treasury. Consequently the Government gold reserve has experienced a rapid shrinkage. On Tuesday the amount of free gold held by the Treasury had been reduced to \$83,000,000, with the prospect of a further heavy decline during the current week, as the foreign exchanges maintain their strength and keep steadily at or above the gold exporting point. The total shipments of the metal last week amounted to \$6,300,000, and since the opening of the present week \$1,800,000 more have been sent abroad. Should the movement continue for a few weeks longer at the present rate, the Treasury gold reserve would be reduced to the low level which it reached prior to the issue of bonds in January last. Meanwhile there is

no prospect of any increase in the revenue to balance this loss until the tariff changes are settled and put into effect, and that consummation is not appreciably nearer. Naturally, therefore, the question of another bond issue is again in active agitation by the public, although the Treasury officials profess to be confident that such a course will not be found necessary, and that, for some reasons not explained, the exports of gold are not likely to continue beyond June 1. The situation, however, is beginning to excite some uneasiness in the business community, and tends to depress confidence in the financial situation.

The general business condition of the country, meanwhile, shows little evidence of improvement, although some few industries report a better feeling. The strikes of bituminous coal miners and of coke workers continue, and have resulted in the suspension of numerous works for lack of fuel, besides causing present and prospective embarrassment to some of the railroads. The unsatisfactory condition into which industrial affairs have drifted of late is fully reflected in the returns of railroad earnings, which continue to exhibit serious decreases. The *Financial Chronicle* publishes the net earnings for March, which show a gross loss in that month of \$10,533,121, or about 17½ per cent., and in net \$3,137,000, or about 17½ per cent. For the first quarter of the year the loss in gross has been \$30,523,145, or an average of over \$10,000,000 a month, and a loss in net of \$7,177,654, or an average monthly loss of about \$2,500,000. The March net loss was the largest of any month this year. There were larger losses in net in 1893, but no comparison can be made with them, for it will be remembered that it was only with January, 1894, that the present economy practiced by railroads in expenditures became at all general. "These results will no doubt be thought bad enough," observes the *Chronicle*, "but what is still worse is that future statements are expected to afford a less favorable instead of a more favorable exhibit." The net earnings for April show a larger loss than in March, while the May figures are sure to sink lower still, on account of the coal famine.

East bound shipments by rail from Chicago showed a considerable falling off last week. They amounted to but 47,523 tons, as against 52,856 tons for the previous week and 52,343 tons for the corresponding week last year. Lake shipments last week amounted to 50,720 tons, against 54,875 tons for the previous week. Commodities in general have during the week scored the lowest prices ever known. Wheat for prompt delivery sold down on Friday to 56¢ ¢ bushel, or less than 1¢ ¢ lb. It has, however, taken a turn upward during the present week and gained a point and a fraction, closing on Tuesday at 57¢ ¢. Corn is weaker, with large receipts and small exports, and cotton has also declined. The decrease in domestic trade represented by bank clearings was 27.7 % last week. One bright spot is seen, however, in the record of failures for the week ending last Saturday, which, according to *Dun's*, amounted to 220 in the United States against 247 last year, while the diminishing importance of the liabilities was marked, amounting to less than \$2,000,000. Another favorable feature is the unanimous decision of the Western railroads to restore their rates on Saturday next.

Saturday's bank statement showed a decrease in the surplus reserve above legal requirements of \$1,635,450, the

surplus now standing at \$79,000,000. There was a slight contraction, both in loans and in deposits, while a peculiar feature of the statement was an increase in specie in a week where over \$6,000,000 gold was exported from New York.

The money market shows little change, except that there is a disposition on the part of lenders to restrict loans to short dates in preference to longer periods. Consequently rates for the longer periods have been firmer. Call money is still offered at 1 per cent., although some of the banks are asking as much as 1½. The demand for time loans is chiefly for long terms, and the supply of money for short dates is largely in excess of the demand. The current rates are 1½ % for 30 to 60 days, 2 % for 90 days, 2½ % for 4 months and 3 % for 5 months and to the end of the year. Mercantile paper continues in good demand. Some of the banks are out of the market for this material, while others have advanced their rates. Quotations are: 2½ % for very choice indorsements, 2½ % @ 3 % for 60 @ 90 days indorsed bills receivable, 3 % @ 3½ % for 4 months' commission house names, 3½ % @ 4 % for good 4 @ 6 months' single names and 4 % @ 5 % for those not so well known.

The record of the Stock Exchange for the past week has been one of more or less depression. Business has been generally confined to the professional element and has centered largely round the vagaries of sugar stocks, which have been most unblushingly manipulated by certain inside speculators. The stock dropped 13 points in two days of last week, touching 91. On Tuesday of this week, however, it rose again to par, scoring a gain of 8 points and monopolizing about one-half of the total transactions of the exchange. The "bears" controlled the market during the greater part of the week under review, hammering down a number of the railroad stocks, particularly the Grangers, which, however, recovered smartly on Tuesday. Northern Pacific preferred shares were on Monday carried down 3½ points on rumors that the receivers would not be permitted to pay the July interest on the first mortgage bonds of the road. The shares of other bankrupt roads, as Reading and Union Pacific, declined in sympathy. Foreign buying of American railroad stocks, which has been resumed to some extent during the present week, has given a firmer tone to the market, which closed on Tuesday stronger and more cheerful. Wednesday brought a sharp rally. The following list exhibits the extreme fluctuations of the more active stocks during the week since May 17, together with the closing prices on May 23:

	High-est.	Low-est.	Closing
Am. Sugar Ref.....	104½	91	102½
Atchison, T. & S. Fe.....	10½	8¾	9½
Chicago Gas.....	69½	65½	70½
Chic., B. & Q.....	79	75½	77½
Chic., Mil. & St. Paul.....	59½	56½	58½
Chic., Rock Isl. & Pac.....	68½	65½	67½
Distilling & Cattle Fdg.....	25	21½	23½
Gen. Electric.....	36½	33½	33½
Louisville & Nashville.....	46½	43½	45½
Manhattan.....	122½	113	118½
Missouri Pacific.....	27½	24½	26
National Lead, Common.....	38½	36½	37½
N. Y., L. E. & Western.....	14½	12½	15
N. Y. & New England.....	5½	3½	4½
Northern Pacific, Pfd.....	17½	12½	15
Philadelphia & Reading.....	16½	14½	16½
St. Paul & Omaha.....	37½	34½	36½
Union Pacific.....	17½	14½	16
Western Union.....	84	81½	83½

Trading in railroad and miscellaneous bonds has been somewhat light, but the market is stronger, with an advance on some issues. Government bonds have been inactive, but steady. Closing



rates for the latter were quoted on Wednesday as follows:

	Bid.	Asked.
2's, 1891, registered.....	98	113%
4's, registered.....	113%	113%
4's, coupon.....	113%	114%
5's, registered.....	117%	118%
5's, coupon.....	117%	118%

Sterling exchange advanced on Monday, and remains strong, with rates at the gold shipping point, owing to the scarcity of commercial bills. Actual business was done on Wednesday at \$4.87½ @ \$4.87½ for 60 days, \$4.88½ @ \$4.89 for demand, \$4.89 @ \$4.89½ for cables and \$4.86½ @ \$4.86½ for commercial.

Domestic exchange on New York is quoted as follows: New Orleans, commercial 100 premium, bank 150 premium; Charleston, buying par, selling ½ premium; San Francisco, sight 10, telegraph 15 premium; Savannah, buying par, selling ½ premium; Chicago, 30 @ 40 premium.

Silver is stronger and steady at 28½ pence per ounce for commercial bars in London and 62½¢ nominal, per ounce in New York. Shipments of the metal during the week from New York have amounted to 725,000 ounces.

## New York.

Office of *The Iron Age*, 96-102 Reade street, New York, May 23, 1894.

**Pig Iron.**—The expected advance of freights from the Lehigh Valley to New England points, which is now \$1.75, has not alone stimulated shipments but has also led to quite a number of sales, among them some to cover requirements for quite a considerable period. There is more inquiry also from the territory north of Albany, which has been so largely controlled by the Buffalo and valley furnaces, as the result of the stoppages of these furnaces through the coke strike. Prices have not been affected, however, although Eastern Pennsylvania producers are more conservative in the sales for delivery during the second half of the year. The scarcity of Bessemer Pig has led to drawing quite heavily on old stocks. The Troy company have sold 25,000 tons, 15,000 tons being shipped to Scranton and 10,000 tons to Pittsburgh. It is reported also that a New Jersey furnace has sold 5000 tons out of a stock of 8000 to 9000 tons to an Eastern Pennsylvania Steel works. A lot of 3000 to 4000 tons carried by a Lake Champlain producer has not, according to last accounts, been disposed of. The better outlook for the Connellsville region during the last few days has led buyers of Bessemer Pig to withdraw. We quote standard brands \$12.50 @ \$13 for No. 1; \$11.25 @ \$12 for No. 2, at tidewater. Southern Iron, same delivery, \$11.50 @ \$12.25 for No. 1; \$10.50 @ \$11 for No. 2; \$10 @ \$10.25 for No. 3; \$10.25 @ \$10.75 for No. 2 Soft, and \$10.50 @ \$11 for No. 1 Soft. Foundry No. 4 (Foundry Forge) is \$9.75 @ \$10.25; Bessemer Pig, prompt delivery, \$12 @ \$12.50, at furnace.

**Ferromanganese.**—There is very little doing in foreign, which is quoted \$52 @ \$52.50 for small lots.

**Steel Rails.**—The market is very quiet. Quotations remain \$24.80, tidewater, for Standard sections; \$22 @ \$24, tidewater, for Light Sections, and \$21 @ \$24, at mill, for Girder Rails.

**Track Material.**—We quote as follows for small lots: Spikes, 1.50¢ @ 1.70¢; Fish Plates, 1.20¢ @ 1.40¢; Track Bolts, Square Nuts, 2¢ @

2.10¢, and Hexagon Nuts, 2.10¢ @ 2.30¢, delivered.

**Billets and Rods.**—Leading authorities attach very little significance to the reports that sales of American Blooms and Billets have been made in the English market. A small lot has actually been shipped from Baltimore. With German Billets at 75 marks, Antwerp, say \$18, sustained competition is out of the question.

**Manufactured Iron and Steel.**—The contract for the American Tract Building, which takes 2500 tons, has been placed with A. R. Whitney & Co., agents of the Carnegie Steel Company. Figures on another large building go in to day. For prompt delivery the Western mills are asking an advance of 0.1¢ @ 0.15¢ per lb, and the Eastern mills, too, are stiffer, but for forward delivery prices remain very much as they have been. The demand is light, and buyers are not yet convinced that the advance in raw material will outlast the strike long. We quote: Beams up to 15-inch, 1.30¢ @ 1.50¢ for round lots; Angles, 1.20¢ @ 1.35¢; Universal Mill Plates, 1.15¢ @ 1.35¢; Tees, 1.40¢ @ 1.60¢; Channels, 1.30¢ @ 1.50¢, on dock. Steel Plates are 1.20¢ @ 1.30¢ for Tank; 1.35¢ @ 1.40¢ for Shell; 1.55¢ @ 1.60¢ for Flange, and 1.75¢ @ 2¢ for Fire Box, and 2¢ @ 2.25¢ for Locomotive Fire Box, on dock; Refined Bars are 1.20¢ @ 1.9¢, on dock, and Common 1.05¢ @ 1.20¢; Soft Steel Bars are 1.15¢ @ 1.30¢; Scrap Axles are quotable at 1.35¢ @ 1.50¢, delivered; Steel Axles, 1.35¢ @ 1.50¢, and Links and Pins, 1.40¢ @ 1.60¢; Steel Hoops, 1.40¢ @ 1.50¢, delivered; Cotton Ties, 60¢ @ 70¢ per 45-lb bundle, tidewater; Machinery Steel, 1.20¢ @ 1.40¢; Toe Calk, 1.80¢ @ 1.90¢, and Sleigh Shoe, 1.60¢ @ 1.75¢, delivered.

## Metal Market.

**Pig Tin.**—Prices dropped a fraction in this market during the early portion of the week under review, or to the basis of 19.80¢, net cash, for 5 ton or larger lots. Small parcels were sold out of store at relatively as low price. Latterly the market was turned about through nicely timed nursing, but not in a manner indicating anything in the way of natural reaction. Purchases were made at 19.97½¢ for prompt and 19.90¢ @ 19.95¢ for May delivery, and at the close it seemed difficult to buy at less than 20¢, net cash. Still, small quantities were dealt out at prices very low to those which prevailed in the speculative branch, or at 20¢ @ 20.10¢. There was no sign of broader buying interest, however, and it seemed very doubtful if fully the average amount of Tin has been taken up by consumers and jobbers thus far this month. The arrivals since the 1st inst. aggregate 1305 tons, 560 tons of which have come in during the past few days. The new supply is apparently well taken care of.

**Copper.**—The market is unsettled and weak, so much so in fact that outside quotations would appear to be nearer to true market value than the figures that might be termed official or close upon it. The outside figures are about 9.25¢ for Lake Superior Ingot, and 8.80¢ @ 8.85¢ for ordinary casting brands. It is a matter of record that Lake Ingot has been openly offered at 9.35¢, and some of the casting brands at under 9¢, and the rumors of business or offerings at less seem to have some foundation. It

is the proper thing, however, according to some prominent sellers, to place the quotations at 9½¢ for Lake Ingot, 9½¢ @ 9½¢ for Electrolytic, and 8½¢ @ 9¢ for casting brands. Home trade demand is extremely commonplace, and export outlet is not only smaller but poor, since prices have dropped about 10/ in the London market.

**Pig Lead.**—Business has been done at as low as 3.30¢ @ 3.32½¢. Single carloads of Soft Missouri were sold by speculators. About 50 tons desilverized went at 3.32½¢. Those prices are considered exceptionally low, but the market nevertheless has a very soft appearance, since consumers are very indifferent buyers, while the speculative firms that bought some time ago at 3.50¢ @ 3.60¢ are lending no support.

**Spelter.**—Some of the least favored brands of Common Western have been sold and are still offered at as low as 3.40¢ delivered here or at common point. Others were offered at 3.45¢ @ 3.50¢, and with sufficient freedom to indicate a weakish market. The extremely low prices fail to stimulate business on home trade account, since consumers find buying easy in the face of more or less movement on speculative account.

**Antimony.**—The market is free from other than ordinary trade conditions. These serve to keep prices easy at about 10¢ @ 10½¢ for Cookson's, 8½¢ @ 8½¢ for Hallett's and corresponding figures for other brands.

**Nickel.**—Prices are largely variable, as usual, with 45¢ @ 50¢ apparently a fair range on ordinary jobbing quantities.

**Tin Plate.**—More business has been done in Plates for both prompt and future delivery. The volume, however, was hardly in line with what is usual at this season of the year. Low prices were the rule on business involving either spot goods or forward shipments, and evidence is wanting of any decided improvement in tone of the market. For stock on the spot we quote as follows: Coke Tins—Penlan grade IC, 14 x 20, \$5; J. B. grade, full weight, \$5.15; light weights, \$4.75 for 100 lb, \$4.62½ for 95 lb, \$4.55 for 90 lb; Bessemer full weight, \$5.15; light weights, \$4.70 @ \$4.75 for 100 lb, \$4.60 for 95 lb, \$4.55 for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.35; Siemens Steel, IC basis, \$5.45; IX basis, \$6.50. Charcoals—Melyn grade, IC, \$6.25; Crosses, \$7.75; Alloway grade, IC, \$5.40; Crosses, \$6.50; Grange grade, IC, \$5.50; Crosses, \$6.60. Charcoal Terns—Worcester, 14 x 20, \$5.70; do., 20 x 28, \$11; M. F., 14 x 20, \$7.20; do., 20 x 28, \$14.50; D. R. D. grade, 14 x 20, \$5; do., 20 x 28, \$9.70; Alyn grade, 14 x 20, \$5.20; do., 20 x 28, \$10 @ \$10.25. Wasters—S. T. P. grade, 14 x 20, \$4.60; do., 20 x 28, \$9; Abercarne grade, 14 x 20, \$4.50; do., 20 x 28, scarce.

**Aluminum.**—The following are current quotations: No. 1 Aluminum, over 98 % pure, 65¢ per lb in small lots; 63¢ per lb in 100-lb lots; 60¢ per lb in ton lots; No. 2 grade, over 94 % pure, 60¢ per lb in small lots; 55¢ per lb in 100-lb lots, and 50¢ per lb in ton lots.

The Pittsburgh Reduction Company have issued a revised price-list of Aluminum, Ingot, Plate and Sheet, and Wire. The price of Plate and Sheet has been reduced 10¢ from the list printed in *The Iron Age* of February 1, or to 80¢ base for ½ inch and heavier of

a width wider than 8 inches and not wider than 12 inches. The Wire list has been entirely changed, as follows:

*Aluminum Wire.—B. & S. Gauge.*

Diameter B. & S. Gauge	Price per pound.
Nos. 9 to 14.....	\$1.00
Nos. 16 and 17.....	1.05
Nos. 18 and 19.....	1.10
No. 20.....	1.25
No. 21.....	1.40
No. 22.....	1.50
No. 23.....	1.60
No. 24.....	1.75
No. 25.....	2.00
No. 26.....	2.25
No. 27.....	2.50

### Effects of the Coal Strike in Canada

Although Canada possesses immense coal fields, it is well known that they are so situated in the extreme eastern and extreme western portions of the Dominion that the central section can be more economically supplied with bituminous as well as anthracite coal from the United States than from Canadian mines. The province of Ontario, as far east as Brockville, is the territory which a continuation of the strike of the American miners would most affect. The province took 1,506,000 tons of the 1,550,000 tons of bituminous coal imported by the Dominion from the United States in the fiscal year 1893. The curtailment of the supply across the border is already felt by manufacturers in the Ontario peninsula, but suspension of operations does not necessarily follow if the manufacturers are to pay the enhanced cost of fuel represented by the freight on Nova Scotia coal. The Nova Scotia operators would be only too glad to extend their market westward, and their facilities are sufficient to supply a much greater demand than at present exists.

The Grand Trunk Railway is the one great interest in Canada which the strike has seriously affected. As traffic and lines are chiefly centered in Ontario, it relies upon United States mines for most of its fuel. The coal contracts made by the Grand Trunk Company this year were particularly favorable in point of price, and in these days of reduced earnings the management is naturally loth to pay a higher price for fuel than has been contracted for. Coal consigned to the Grand Trunk has been seized *en route* by American railroads, which, in New York State at least, is lawful in cases of emergency. These are the reasons given for the reduction in number of trains and the discharge of hundreds of employees which has just been made. It is hinted, however, that the management is taking this opportunity of husbanding its cash resources to meet certain important financial obligations which soon mature. It is estimated that 1500 employees of the Grand Trunk in Ontario have been laid off. The shops have been closed down and the number of freight trains reduced. Coarse freights, such as lumber, cord wood, &c., are being refused, but perishable goods, general merchandise, dry goods, hardware, &c., are being carried as usual. By this saving in the fuel consumption the road will probably be able to carry on its present traffic for several weeks without further embarrassment and without becoming a large consumer of Nova Scotia coal.

The Canadian Pacific Railway, with coal mines in the neighborhood of each terminus and elsewhere, is differently situated to the Grand Trunk. The management of the Canadian Pacific claim that it has always been its policy

to prepare for a coal strike. This road uses Galt and Kenmore coal on its western lines as far east as Winnipeg, and has large supplies stored on the north shore of Lake Superior, at Fort William and other points. The lines east of Smith's Falls and Ottawa are supplied from Nova Scotia, so that the mileage fed by coal from Pennsylvania or Ohio is comparatively small. No steps to curtail traffic on this road have yet been taken.

The manufacturing establishments of Montreal use Nova Scotia coal and consequently do not fear any shortage in their supply. Nor do they anticipate higher prices, as it is understood that the coal companies will protect their old customers even if they should experience a heavy demand for fuel from new buyers.

Cumberland coal, however, is imported at Montreal for blacksmiths' and similar fires. A cargo of 3000 tons of this coal arrived in that city recently from Baltimore, but was immediately purchased by the Central Vermont Railroad, as it could be returned to the United States duty free. Another cargo of this coal is expected soon, which will probably meet the same fate. The passenger and freight arrangements of American roads running into Montreal have so far not been embarrassed.

The United States cruiser "Columbia" underwent an entirely successful deep sea trial early in the week. Three six-hour steam trials were made, one under full speed with all three engines working, one with two screws working and the center screw disconnected, and one with the center screw at work and the side screws disconnected. The vessel was not forced to great speed, but she developed 18½ knots an hour under natural draft. The test for coal endurance showed that the "Columbia," under a speed of 10 knots an hour can steam on 35 tons of coal a day, and under 14 knots with 70 tons of coal a day. During the trial the "Columbia's" battery was tested, all her guns being fired three times, once with a reduced charge and twice with a full service charge. Some trifling defects were discovered in the secondary battery which can be easily remedied; otherwise the battery worked perfectly.

Henry Clews & Co. of New York in the last weekly financial letter say: "Among the new enterprises at present held in suspense perhaps the foremost is railroad construction. During late years the additions to our railroad system have been quite exceptionally light. Between the years 1880 and 1887 there was an increase in mileage of 56,000 miles, or an average of 8000 miles per year. For the four next succeeding years the annual increase averaged but 5300 miles, and for the two last years the new construction has averaged only 3350 miles. Judging from past experience, the present very low rate of construction may be regarded as preparing the way for an important revival of this form of enterprise; and it is well understood that in the higher circles of capital arrangements for important undertakings are already in the formative stage. This is the more to be expected from the fact that the present low price of railroad iron and the decline in wages afford an exceptionally attractive opportunity. Railroads at present cost of material and labor can be built for much less than paid around 1880. The temptation to build new roads is therefore very great; besides which there are many existing

roads that need extensions and increased equipment, while the growth of the country has created a demand for new lines. The undertaking of works of this character would give an indirect impulse to business at large and help the general recuperation. These are among the things on which Wall street has its eye in its expectation of an early revival of the financial markets."

## THE WEEK.

A commercial crisis is happening in Argentina. According to a recent cable dispatch from Buenos Ayres business failures occurred in that city during the first ten days of May with liabilities aggregating \$20,000,000, while other large failures were regarded as imminent.

From Aspen, Col., comes the news of the excavation of one of the largest and richest silver nuggets ever brought to the surface. It was taken out of the Smuggler Mine, near Aspen, and weighed 3300 pounds, containing silver to the value of \$25,000.

To regulate business and prevent ruinously low prices the salmon canners of British Columbia have combined to limit the salmon pack this year to a certain quantity from each cannery, and to fix a standard price at which sales will be made.

The New York and New Jersey Bridge bill, amended to meet the President's objections to the original measure, passed the House of Representatives on May 7.

The bill, promoted by the New York Academy of Medicine, providing for the establishment of a National Health Bureau has been favorably reported to the House by the Committee on Interstate and Foreign Commerce, and the measure has a good prospect of being passed into law by the present Congress.

The new \$3,000,000 tunnel built through the Palisades by the Susquehanna & Western Railroad was formally opened for coal traffic on May 15. The tunnel is nearly 2 miles long.

In consequence of the recent discovery of frauds in the Boston Custom House, Secretary Carlisle has issued an order to the special Treasury agents directing them to examine every bonded warehouse in the country. The agents in New York City have already begun their inspection, which it is estimated, will occupy one year at least, as there are some 70 to be gone through.

One of the results of the soft coal strike is that the largest fleet of idle vessels ever seen on the Delaware now floats there awaiting the termination of the trouble—and cargoes.

Last week was a sad one for the fire insurance companies in the East. Beginning with the destruction of the Brooklyn Tabernacle and the adjoining hotel on Sunday, May 13, almost every day scored records of large and destructive fires in New York, Boston, Brooklyn and Philadelphia.

Coxey's "popular" movement has come to an ignominious period by the consignment of the Commonweal leader and his principal lieutenants to jail in Washington on conviction of the offenses of displaying unlawful banners in the Capitol grounds and trampling on the grass. The whole episode has attracted far more attention than it merited.



## British Metal Market.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, May 23, 1894.

Pig Tin declined slightly early in the week owing to absence of speculative support and decline in silver prices. The lower rates brought better demand, under the influence of which prices reacted to £71. 12/6 @ £71. 15/ for prompts. Some support came also from covering of bear accounts. The two offset the effect of reports of heavy shipments recently from the Straits. It is asserted that some speculators are locking up spot Metal. Business the past few days has been moderate and the market closes easier, with prices at £71. 10/ for prompts and £71. 17/6 for three months' futures.

Merchant Bar Copper declined about 10/ under the weight of speculative realizations and smallness of purchases by consumers. At the decline, however, the market has become steadier and prompts realized £39. 2/6 on Monday. American arrivals have been lighter and there is some decrease in European spot stock. The visible supply is smaller by about 600 tons than it was at the beginning of the month. Sales of furnace material have been heavier, but few particulars are divulged. It is stated that 2000 tons of American Matte have been placed since the beginning of the month, but this report requires confirmation. At the close the market was firmer. Merchant Bars were quoted at £39. 5/ for prompts, £39. 12/6 for three months' futures and Best Selected English at £42.

Tin Plate market is somewhat firmer, but divergent views of buyers and sellers on values hamper business. There is more inclination to contract for forward deliveries and buyers offer better rates than were current a short time ago. Inquiry from Canada is especially good, owing partly to reduction in ocean freight rates. Bessemer Cokes are about 1½ pence and ternes about 6 pence dearer. Swansea quotations are as follows:

Bessemer Cokes, 14 x 20 ..... 9/10½ @ 10/1¼  
 Siemens Cokes, 14 x 20 ..... 10/4½ @ 10/6  
 Ternes, double box ..... 18/3 @ ..  
 Charcoals ..... 11/ @ 13/

Pig Lead has undergone very little change in price and the market is flat, with £9 @ £9. 2/6 quoted for Soft Spanish.

Spelter is in only limited demand and prices remain at about £15. 12/6 @ £15. 15/ for ordinary Silesian.

Pig Iron warrants have been dull and prices have weakened off to 41/5 for Scotch, 35/1½ for Cleveland and 43/9 @ 44/ for Hematite.

At the invitation of the receivers of the Troy Iron and Steel Company a conference between them, the creditors and the stockholders was held in this city on Tuesday. The receivers placed a statement of the affairs of the company before the meeting and asked for the advice of those assembled. The situa-

tion was discussed and it was suggested that the present course of working up the raw material on hand be continued. The company are shipping out of their stock of Bessemer pig iron from 700' to 1000 tons per day to fill orders of 10,000 tons for Pittsburgh and 15,000 tons for Scranton.

**Test of 18 Inch Armor Plate.**—The destruction of the 18 inch armor plate at the Indian Head Proving Ground last Saturday, by a single shot from a 12-inch rifle, should not lead to hasty judgment respecting either the value of the Harvey process or the quality of the rest of the plates forming this group. These plates, of which there are 20 in the group, are 15 feet 11 inches long, 7½ feet wide and 18 inches thick except on the bevel, which begins 42 inches from the bottom and tapers to a thickness of 8 inches. The first shot had a velocity of 1465 feet per second and struck the plate a little above and to the right of the center. This developed three wide cracks, one extending to the left hand end, another to the top and the third to the bottom. A second shot, having a velocity of 1923 feet, struck the plate about midway between the first impact and the right hand edge, and opened a crack forming a continuation of the one leading to the left hand edge. Before the plate was fired at it was thought to be defective and to have internal cracks. It was therefore selected by the representatives of the Government as being the poorest of the lot. In view of the high reputation justly obtained by plates of smaller thicknesses treated by the Harvey process, it would be unjust to jump at the conclusion that the process is not applicable to plates over 14 inches in thickness. Neither should the remaining 19 plates of this lot be condemned because one, evidently defective, had failed to come up to the requirements. A second plate selected from this group will be tested, and criticism should be suspended until the result is known.

The H. P. Nail Company of Cleveland, Ohio, telegraph us under date of May 22: "Our works will start up in all departments on May 23. We have material to continue for a month or more regardless of the coal strike."

Black Diamond Tin Plate Works, Philadelphia, H. W. Scattergood, proprietor, are reported to be quite busy. Three tinning machines are in active operation, turning out both charcoal and coke bright tin plates and American roofing plates, for which a good demand has been met with. It is the intention of the proprietor to add more tinning pots as the exigencies of business demand. The brands of terne plates produced at the Black Diamond Works are Laurel, Arrow, Quaker City, Horse Shoe, and Black Diamond. The agents in New York City for the Black Diamond Works are Temple & Lockwood, 12 Platt street.

The metal ore production of Greece in 1893 was as follows: Iron ore, 142,445 tons; manganese ore, 157,756 tons; chrome iron ore, 1470 tons; manganese, 11,716 tons; magnesite, 10,100 tons; emery, 1479 tons; lead ore, 2380 tons; galena, 24,769 tons.

H. V. & H. W. Poor, publishers of Poor's Manual, have removed their office from 70 Wall street to 44 Broad street, New York.

## CONTENTS.

	PAGE.
Double Head Horizontal Boring Machine. Illustrated.....	983
A Canadian on American Tin Plate.....	983
Western Foundrymen's Association.....	984
The Jones Under Feed Mechanical Stoker. Illustrated.....	986
Test of Armor Plate.....	986
A Specimen Specification.....	987
The Use of Water Tube Boilers in the Navy.....	988
The Daniels Steel Railroad Tie. Illus.....	991
Changes in the Canadian Tariff.....	991
The Influence of Varying Temperature on Metals. Illustrated.....	992
San Francisco News.....	994
Automatic Wire Cutting and Milling Machine. Illustrated.....	995
The National Lead Company.....	995
Long Rails.....	995
The Morgan Continuous Billet Mill. Ill.....	996
Editorials:	
Discouraging Business Conditions .....	998
Electrically Driven Tools.....	998
The Hawdon & Howson Blast Furnace.....	999
Obituary.....	999
Personal.....	999
Correspondence.....	1000
Changes in the Metal Schedule.....	1000
Washington News.....	1000
Pittsburgh and the Coal and Coke Strikes.....	1001
Rolling Black Plates on Sheet Mills.....	1001
Manufacturing:	
Iron and Steel.....	1002
Machinery.....	1003
Hardware.....	1003
Miscellaneous .....	1003
The Iron and Metal Trades:	
Philadelphia .....	1004
Chicago.....	1004
St. Louis.....	1005
Cincinnati.....	1006
Financial.....	1006
New York.....	1007
Metal Market .....	1007
Effects of the Coal Strike in Canada.....	1008
The Week.....	1008
British Iron and Metal Markets.....	1009
Test of 18-Inch Armor Plate.....	1009
Hardware:	
Condition of Trade .....	1010
Notes on Prices.....	1010
Southern Hardware Jobbers' Association.....	1012
Opening of the Hardware Club.....	1012
Manufacturers' Association of Kings and Queens Counties .....	1012
Relations Between Jobbers.....	1013
Letters from the Trade.....	1013
Trade Items.....	1014
Spalding Bicycles.....	1014
Price-Lists, Circulars, &c.....	1014
It Is Reported.....	1014
Paints and Colors.....	1015
Lineroid Boats.....	1015
Leather Handle with Snaps.....	1015
Electric Telephones. Illustrated.....	1016
The Cyclone Pump. Illustrated.....	1016
Spery Serrated Edged Knives. Illus.....	1017
The Hall Cyclometer. Illustrated.....	1017
The Imperial Ball Bearing Carriage Axle. Illustrated.....	1017
The New Permutation Bicycle Lock. Illustrated.....	1017
Dixon's Solid Graphite Cycle Lubricant. Illustrated.....	1018
Phenix Meat Cutters. Illustrated.....	1018
Micrometer Caliper.....	1018
Germantown Tack Hammer. Illus.....	1019
The Perfect Nipple Grip. Illustrated.....	1019
Ball Bearing Device for Bit Braces. Illustrated.....	1019
Central Draft Street Lamps. Illus.....	1019
Simonds' Improved Saw Tool. Illus.....	1020
Automatic Date and Time Stamp. Ill.....	1020
No. 16 Novelty Spray Pump. Illus.....	1021
Spray Nozzle. Illustrated.....	1021
The Davenport Single Gun. Illus.....	1021
Novelty Spray Pump No. 15. Illus.....	1022
The Denison Quick Acting Vise. Illus.....	1022
Curtis Pipe Cutter. Illustrated.....	1022
Barnes' Sash Chain Fixture. Illus.....	1022
Current Hardware Prices.....	1023
Current Metal Prices.....	1030

# HARDWARE.

## Condition of Trade.

**B**USINESS continues in moderate volume, but the fact that the trade are buying in very small quantities and more frequently than usual tends to keep jobbers and manufacturers relatively busy, although the aggregate of sales is not up to the average. Prices are without important change and the market on the whole is low and irregular. The effect of the strikes remains to be seen. This matter would be a much more disturbing factor if there were anything like a normal demand for the product of furnaces and mills. As it is, some of them can close without materially affecting the market. Collections continue sluggish.

### Chicago.

(By Telegraph.)

The Shelf Hardware trade keeps up very well. Orders have been quite numerous the past few days, and the month now promises to be fully as good as March or April. Some stimulus to trade has been imparted by the notice of an advance in freight rates to the West. Shipments have been hurried forward on this account to a noticeable extent. Jobbers, however, hope that trade will hold up to about its present volume through the summer. They have done so much better than they expected that they are inspired to take an encouraging view of the future rather than discouraging. Staple goods are hardening on account of the advance in raw material, and higher prices are being made every two or three days. Roofing Plates are still very scarce, especially American brands, but prices are held down to old rates. The Heavy Hardware trade is quiet, not only in Iron and Steel, but in wagon and carriage stock. The recent cold snap which has injured vegetation is looked upon with some apprehension, as it may still further depress the demand from farming interests, on which the Heavy Hardware trade depends largely for its prosperity.

### St. Louis.

(By Telegraph.)

Shelf goods continue to be ordered in satisfactory quantities. The cold, rainy weather which has prevailed throughout the entire West during the past week has caused a general depression in many lines, principally in what are known as hot weather goods. The outlook is encouraging, however, and an improvement in the weather will find

a corresponding improvement in trade. The combination among the Wire Nail manufacturers has advanced the price so that jobbers are now asking \$1.25 to \$1.30, with a fair prospect of holding these prices. Advances are now heard from in Steel and Iron, so that manufactured goods may soon be in line for improvement in this direction. The cut rates to the West have enabled jobbers to load up the Western trade, which has materially assisted in building up the volume of trade for the present month. Collections are fair.

## Notes on Prices.

**Wire Nails.**—The Wire Nail market continues in substantially the same condition as last week as to the volume of business, but has a decidedly firmer tone, as the manufacturers, in view of the increased cost of raw material and the uncertainty as to the supply of fuel, are naming higher prices. Most of the mills are adhering to \$1.10 at mill, but it is thought that this figure can in some cases still be shaded slightly. In view of the situation there is a disposition also to take orders subject to prices ruling at the time of shipment, and another advance would not be surprising. Small lots from store in New York are held at \$1.25 to \$1.30.

*Chicago, by Telegraph.*—Manufacturers' agents report some demand from large distributors, but buyers generally are holding off until the situation clears up. Manufacturers are advancing prices on account of the scarcity of fuel and higher values of raw material. They are quoting at last advices \$1.10 at mill, or about \$1.20, Chicago, but agents are now instructed to take orders subject to factory acceptance. Jobbers have made two advances during the week, and now quote \$1.20 for small lots from stock with no reduction for carloads.

**Shot.**—Under date May 23 a reduction has been made in the price of Shot, the new quotations being as follows, terms net 30 days or 2 per cent. discount for cash in 10 days:

Drop Shot, up to B, 25-pound bag.....	\$1.10
5	.35
Buck Shot (including Bs, Ts and F), 21-pound bag.....	1.35
Buck Shot (including Bs, Ts and F), 5-pound bag.....	.40
Chilled Shot, 25-pound bag.....	1.35
5	.40
Dust Shot 25 ".....	1.75
5 ".....	.45

In lots of 2000 pounds and upward taken at one time a discount of 5 cents per bag of 25 pounds will be allowed, and a special discount of 2½ per cent. will be given on 1 ton and upward

bought, invoiced and paid for at one time.

**Loaded Shells.**—The Union Metallic Cartridge Company, Bridgeport, Conn., and 313 Broadway, New York, announce under date May 19 that they have reduced the price 2½ per cent. on their regular quality New Club Shells loaded with black powder. All orders on file will be invoiced at this reduced price. Discounts remain unchanged on Smokeless, Trap and Walsrode Shells loaded with nitro powders, and former discounts without the above reduction of 2½ per cent. will also apply to the new Black Club Shells loaded with black powder, which will be ready June 1. To insure prompt shipment of Loaded Shells they urge their customers to place orders early. They will accept orders for shipment prior to December 31, 1894, and guarantee prices to time of shipment against any reduction by them. No change is made in the price of Empty Shells. The company also announce that they are now prepared to supply improved quality Nitro Club Paper Shells, salmon color, long brass heads, with No. 4 U. M. C. Primers. These are sold unloaded and are also adapted to either Nitro or Black Powder. On June 1 they will have ready their new Black Powder Shells branded Black Club, brown color, long brass heads, primed with No. 2 U. M. C. Primers. The following are the list prices of Improved Nitro Club and Black Club Shells, which are subject to the usual discounts:

12-gauge, 2½ inch.....	\$8.00
12 " 2¾ ".....	9.00
10 " 2¾ ".....	9.00
10 " 2⅞ ".....	9.00

Improved No. 4 U. M. C. Primers for Nitro Club only are listed at \$1.20.

**Cut Nails.**—A somewhat firmer tone has been given to the Cut Nail market by the prevailing strikes and the fact that some of the mills at least are suspending operations for a time. The price of Western Nails at mill is 90 to 95 cents, the latter quotation being in most cases insisted upon, but lower prices are made in competing for Eastern business. Eastern mills are quoting 95 cents to \$1 for Nails delivered on dock in New York. Small lots from store in New York are still held at \$1.10 to \$1.15.

*Chicago, by Telegraph.*—Inability to obtain Coal has caused the Lakeside Nail Company to shut down, but they have accumulated a stock of Nails which will enable them to supply the trade if the stoppage is not too long. Sales have been good during the week. Prices

are very firm at 95 cents for 55-cent average. Small lots from stock are \$1.05 to \$1.10.

**Barb Wire.**—In sympathy with other products which are affected by the strikes, Barb Wire is somewhat stronger. The market is represented by the following quotations for Four-Point Galvanized, delivered at the points named: Pittsburgh, \$2.05 to \$2.15; Cleveland, \$2.10 to \$2.20; Cincinnati or Allentown, \$2.15 to \$2.25; Chicago or New York, \$2.20 to \$2.30.

*Chicago, by Telegraph.*—An advance is expected on Barb Wire this week, owing to the scarcity of fuel at various works and higher prices of raw material. Inquiries have been fair, and in some instances large shipments have been made to the West in anticipation of higher freight rates. Factory lots of Galvanized Barb Wire are quoted at \$2.20 to \$2.25, Chicago, while small lots sell at \$2.30 to \$2.35, from stock. Painted Wire is held at 40 cents per hundred less than Galvanized.

**Apple Parers.**—We are in receipt of the following revised quotations on Apple Parers manufactured by C. E. Hudson, Leominster, Mass.:

Per dozen.	
Rocking Table.....	\$5.50
Little Star.....	4.00
Daisy.....	3.50

**Common Sense Lawn Sprinkler.**—Stott Garden Implement Company, 136 Liberty street, New York, are manufacturing this Sprinkler, which was described in our last issue. It is quoted to the trade at \$12 per dozen net.

**Wrought Steel Shelf Bracket.**—Griffin's Japanned Wrought Steel Shelf Bracket, manufactured by Lindsay & McCutcheon, Allegheny, Pa., and described in a recent issue, is sold from the following list, subject to a discount to the trade of 75 and 10 per cent.:

Per dozen pairs.	
4 x 5.....	\$1.36
5 x 6.....	2.20
5 x 7.....	2.40
6 x 8.....	3.00
7 x 9.....	3.60
8 x 10.....	4.20
10 x 12.....	6.00
12 x 14.....	9.00

**Refrigerator Fasteners.**—In our last issue we gave an illustrated description of the No. 4 and No. 5. Bronze Metal Fasteners put on the market by P. J. Conroy & Co., Paschall post office, Philadelphia. The No. 4 is sold at \$8 per dozen and the No. 5 at \$6 per dozen, subject to a discount of 40 per cent. to the trade.

**Husking Gloves.**—Blair Husking Glove Company, Bucyrus, Ohio, have added to their line of Husking Gloves for this season Nos. 138, 145 and 150H. The No. 138 is made of California Napa, well protected with disks and furnished with steel claw and pin. No. 145 is made of hog leather, otherwise very similar to the No. 138. No. 150H is made of hog leather, same style in other respects to their No. 150. Their entire line of Husking Pins and Gloves is represented in the following net list:

No. 160 Husking Pins.....	per gross, \$7.00
No. 165 " " " " " "	10.50
No. 170 " " " " " "	per dozen, 2.00
No. 138 " " " " " "	6.00
No. 142 " " " " " "	7.00
No. 145 " " " " " "	7.00
No. 146 " " " " " "	9.00
No. 150 " " " " " "	9.00
No. 152 " " " " " "	7.50
No. 150H " " " " " "	8.00

**The Premium Wringer.**—The Colby Wringer Company, Montpelier, Vt., for whom Surples, Dunn & Alder, 15 Murray street, New York, are direct representatives, have issued the following revised list of their Premium Wringer, the prices given being subject to a discount of 2 per cent. for cash:

Per dozen.	
No. 10, rolls 10 x 1 1/4 inches.....	\$21
" 11, " 11 x 1 1/4 " " " "	25
" 12, " 12 x 1 1/4 " " " "	29

These Wringers are packed half a dozen in a case. The company's circular gives dimensions and weights of the different numbers.

**E. D. Clapp Mfg. Company.**—The following are the revised discounts and net prices applying to the 1894 catalogue of the E. D. Clapp Mfg. Company, Auburn, N. Y., announced by them under date May 10, 1894. Terms, net cash 30 days and 1 per cent. discount for cash in 10 days:

	Discount
per cent.	
Back Prop Irons.....	25
Body Loop Ends, Nos. 1 and 2, 80 cents;	
No. 3, 90 cents.....	5
Body Loops, Finished, per set, 60 cents. Net	
Bolts, Carriage.....	80 and 10
" Milled Coupling, 5/16 and 3/8, \$1.75. 5	
" " 7/16, \$2; 1 1/4, \$3.....	5
" Shaft and Step.....	65 and 10 and 5
" Tire.....	65 and 10 and 5
" Whiffletree, \$2.25 per 100.....	Net
Braces, Head Block, No. 1, 8 cents; No. 2,	
9 cents each.....	Net
Braces, Pole (see Pole Braces).	
" Stay, No. 11, 9/16 oval, 20 cents;	
5/8 oval, 25 cents.....	Net
" Stay, No. 12, 3/4 round, 20 cents;	
7/16 round, 25 cents; 1/2 round, 30	
cents.....	Net
" Stay, No. 12, 1/2 oval, 20 cents, 3/4	
oval, 25 cents.....	Net
Braces, Top, Finished, No. 1, with Regular	
Joints.....	Net
9/16, 60; 5/8, 70 Black.....	Net
9/16, 65; 5/8, 75 Polished.....	Net
Braces, Top, Finished, No. 2, with New	
Half Joint.....	Net
9/16, 45 Black.....	Net
9/16, 50 Japanned.....	Net
Canopy Offsets.....	25 and 5
" Sockets and Standards.....	40 and 5
" Standards, Finished.....	50
Clips, Axle, Norway, 1877 Pattern,	
65 and 10 and 5.....	
" " " " B Grade.....	70
" " " " 3/8 Wagon.....	65 and 5
" " " " Extra Light and	
Sleigh.....	65 and 10 and 5
Clips, Axle, Norway, Concord Express,	
50 and 5.....	
" " " " Brewster and Tim-	
ken.....	65 and 10 and 5
Clips, Axle, Norway, Point Center and	
Brewster.....	60 and 5
Clips, Axle, Norway, Banner.....	50
" Spring Bar, Norway, Beaded or Oval	
65 and 5 and 5.....	
" Saddle, Brewster, Solid. 60 and 5 and 5	
" " Three Piece, with Plates,	
\$1.10.....	Net
Clips, Saddle, Three Piece, no Plates	
\$1.....	Net
Clips, Saddle, Two Piece, with Plates, \$1. Net	
" Short Spring, 5/16, 50 cents; 3/8, 70	
cents.....	Net
Clips, Fancy Spring, 5/16, 75 cents; 3/8, 90	
cents.....	5
Couplings, Shaft, Finished, complete. 15 and 5	
No. 0, 1/2 inch, and No. 1, 1 inch	
light.....	\$3.25
No. 2, 1 inch heavy.....	3.40
No. 2 1/2, 1 inch heavy, 3/8 Shank.....	3.60
No. 3, 1 1/4 inch light.....	4.25

No. 3 1/2, 1 1/8 inch heavy, 3/8 Shank.....	4.50
No. 4, 1 1/4 inch.....	5.50
No. 5, 1 1/2 inch.....	8.00
Couplings, Pole, Finished, complete:	
Add 25 cents per doz. pairs net to price	
of Finished Shaft Couplings.	
Couplings, Shaft, for Square Axle,	
\$2.75.....	Net
Couplings, Shaft, plain pattern.....	60 and 5
" " unfinished.....	60 and 5
" Pole, ".....	55 and 5
" Sleigh, complete, \$3.25. 15 and 5	
" " no Eyes or Bolts, \$1.60,	
Net.....	
" Side Bar Spring.....	50
" Saunders' Patent Shaft and	
Pole.....	20
Coupling Parts, Clips, Nos. 0, 1 and 2, with	
Bolts, \$2.....	10 and 5
Coupling Parts, larger sizes.....	70 and 5
" " Eyes, Shaft and Pole,	
75 and 5.....	
" " Bolts (see Bolts).	
Dash Feet, No. 18, \$3.36; No. 18 1/2, \$4 per	
doz. pairs.....	Net
Dayton Standards.....	50
Eyes, Pole and Shaft.....	75 and 5
" " long (see Pole Brace Eyes).	
Felloe Plates, in 10 pound boxes, 4 1/4 cents;	
in bulk, 4 1/2 cents.....	Net
Fifth Wheels.....	65 and 5
Gear Irons, Brewster.....	25
Goose Neck Irons.....	25
Head Block Braces (see Braces).	
Joints, Stump, No. 2, Lowmoor.....	50 and 5
" " No. 1, ".....	40 and 5
" " No. 2, Refined.....	60 and 5
" " Auburn Pattern Half.....	60
" Finished (see Braces).	
Joint Ends, Long 9/16 in. oval and 7/16 in.	
round, per set, 20 cents.....	Net
Joint Ends, Long 3/4 in. oval and 1/2 in.	
round, per set, 22 cents.....	Net
Joint Ends, Long 3/4 in. oval, 28 cents. Net	
Joint Ends, Long 9/16 in. Oval Extension,	
30 cents.....	Net
Joint Ends, Long 3/4 in. Oval Extension,	
33 cents.....	Net
Joint Ends, Long 3/4 in. Oval Extension,	
42 cents.....	Net
Joint Rivets, Nos. 4 and 5, \$1 per 100. Net	
" " and Washers, Coach.....	20
King Bolts, Clip, No. 1, No. 2, No. 3, No. 4,	
Flanged Finished, \$2.55, \$2.55, \$3.15, \$4.30,	
40 and 5.....	
King Bolt Braces and Yokes, Nos. 50, 54	
and 63.....	25
King Bolt Yokes and Braces, Nos. 52, 56	
and 3, Light, \$2.....	5
King Bolt Yokes and Braces, Nos. 52, 56	
and 3, Heavy, \$2.50.....	5
King Bolt Yokes and Braces, Nos. 1 and	
4.....	25
King Bolt Yokes without Braces, Nos. 52,	
56 and 3, Light, \$1.30.....	5
King Bolt Yokes without Braces, Nos. 52,	
56 and 3, Heavy, \$1.80.....	5
Lazy Back Irons, \$14 per 100 sets.....	Net
Nuts, Square.....	40
" Hexagon.....	50 and 7 1/2
Offsets, Canopy.....	25 and 5
" Stay Brace.....	6 and 5
Perch and Bed Plates, Nos. 1, 2, 3 and 4	
Single Reach.....	45 and 5
Perch and Bed Plates, Nos. 7 and 8 Double	
Reach.....	40 and 5
Perch and Bed Plates, Nos. 10 and 11	
Double Reach.....	20
Perch and Bed Plates, Brewster Pat-	
tern.....	20
Perch and Bed Plates, Socket Pattern,	
Nos. 25 to 29.....	33 1/2 and 5 and 5
Perch Ends, Nos. 9, 1, 2, 10, 12 and 3.....	20
" No. 15.....	25
Pole Braces, per pair, 1 in., 50 cents; 1 1/2	
in., 55 cents; 1 3/4 in., 63 cents.....	Net
Pole Brace Ends, per pair, 12 cents.....	Net
" Eyes, 1 in., 24 cents;	
1 1/2 in., 26 cents; 1 3/4 in., 28 cents.....	Net
Rails, Foot, No. 1.....	25
" Nos. 2 and 3, \$1.20 per doz. Net	
" Shifting, Nos. 1, 1 1/4 and 3 1/4.....	25
" " Nos. 50 and 52, 50 cents. Net	
Scroll Ends, Phaeton.....	20
Seat Fasteners, Lamb's.....	60
Sockets and Standards, Canopy (see Can-	
opy Sockets and Standards).	
Spools, Rubber, Saunders'.....	20
Spring Couplings, Side Bar (see Coup-	
plings).	
Stay Braces (see Braces).	
Stay Brace Ends.....	65
Step Pads.....	5
No. 1. No. 2. No. 3. Round, 4 1/4 in.	
\$2.25 2.50 3.50 3.50	
Steps, per pair.....	5
Finished, Wrought, No. 1. No. 2. No. 3.	
Side Bar.....	\$0.55 0.60 0.75
Body Brewster.....	.70 .75 .85
" End Spring.....	.70 .75 .85
" Phaeton.....	.75 .95
Axle.....	.55 .60

Round Pads, 4 $\frac{1}{4}$  in. on any of the above Steps, at the price of No. 3 Steps.  
 Surrey, Wrought, No. 3. No. 4. No. 5.  
 \$0.95 1.05 1.20  
 Tubing, Rubber.....25  
 Wheels, Fifth (see Fifth Wheels).  
 Yokes, Clip, Wrought, Plain, in 10-pound boxes, 4 $\frac{1}{4}$  cents; in bulk, 4 $\frac{1}{4}$  cents...Net  
 Yokes, Clip, Wrought, Swaged, in 10-pound boxes, 5 $\frac{1}{4}$  cents; in bulk, 5 $\frac{1}{4}$  cents.....Net

**Glass.**—There is no noticeable increase in the demand for Window Glass, while prices are firm and unchanged since our last report. The outlook is encouraging rather than otherwise, and additional pots are reported as having gone into operation during the past week. The opinion is expressed that tariff legislation will probably not influence the price of Glass during the present fire, and that foreign manufacturers will not import Glass largely while the action of Congress remains uncertain. New York and Pittsburgh markets are represented by the quotations for car lots of 85 per cent. discount for single, and 85 and 5 per cent. discount for double strength Glass. Small lots are quoted at 80 and 20 per cent. discount.

### Southern Hardware Jobbers' Association.

**WE ARE IN RECEIPT** from A. D. Langstaff, president of the Southern Hardware Jobbers' Association, of further advices in regard to the approaching convention, which will be of interest as indicating the careful and comprehensive preparations which are making to render this gathering one of exceptional interest.

The following "senior travelers" have been appointed a Reception Committee for the convention:

Irby Bennett (Honorary member of S. H. J. A.) of Winchester Repeating Arms Company, chairman.  
 Samuel Disston of Henry Disston & Sons.  
 Ed. Bernard of Chas. Parker Company.  
 G. A. Seaver, John Russell Cutlery Company.  
 George Coffin, Lalance & Grosjean Mfg. Company.  
 Chas. J. Healy, New York.  
 Arthur Brittan of Brittan, Graham & Mathes.  
 J. W. Keightley of B. F. Avery & Sons.  
 H. Roshcoe, St. Louis.  
 H. H. Beers, New York.  
 T. P. Burke of J. C. McCarty & Co.  
 Chas. H. Weir of Baltimore.  
 Chas. L. Campbell of Peck, Stow & Wilcox Company.  
 O. C. Mead of New York.  
 Ed. Ingalls of Atha Tool Company.  
 Thos. Ellis of Hermann Boker & Co.  
 W. R. Penniman of Asheville, N. C.  
 S. Kaster of Adolph Kaster & Bros.  
 C. F. Guyon of C. F. Guyon Company.  
 W. E. Austin of Southern Agricultural Works.  
 Frank Wright of Alfred Field & Co.  
 Jas. Surpluss of Surpluss, Dunn & Alder.  
 Jno. K. Wilson of Baltimore.

Recent advices are to the effect that at the approaching convention every

house in the membership will be represented (in some cases by more than one person), including the recently elected members:

Palmer Company, Savannah, Ga.  
 The S. B. Hubbard Company, Jacksonville, Fla.  
 Florida Hardware Company, Jacksonville, Fla.

We are also advised by the president that a number of manufacturers whose products are important factors in the business of the Southern jobbers have been invited to be present. Among these are the following recently elected honorary members:

Samuel Disston of Henry Disston & Sons.  
 A. B. Clarke president Old Dominion Iron & Nail Works.  
 Hamilton Disston of Henry Disston & Sons.

Referring further to this gathering and the pleasant way in which it is expected that the trade will be brought together, we have the following from the president of the association:

This convention will bring together many persons who are not personally acquainted with each other. To assist the association in affording to each visitor to the historic and beautiful city of Richmond a royal Southern welcome and to expedite the introductions to each other, which are essential not only for the transaction of the special work of the association, but in order to have each member and each invited guest in friendly touch, I have appointed the foregoing Reception Committee as the connecting link. Their acquaintance with the members of the association, extending backward in some cases a quarter of a century "when we were boys together," which in many cases has ripened into a sincere friendship, and their continued devotion to the interests intrusted to them, justifies me as president of the Southern Hardware Jobbers' Association in having full confidence in their ability to so transact this business intrusted to them that each of the visitors will be so satisfied with their reception and subsequent kindly treatment that the jobbers will be willing to pay full list price, while the manufacturers, on the other hand, will doubtless be willing to give 90 and four tens and 5 with a "special 5 per cent. to you only."

A number of sub-committees have been appointed from the Manufacturers' Committee on the following lines: Turning Plows, Steel Shapes, Scovil and other Eye Hoes, Barb and Smooth Wire, Shovels and Spades, Handled Hoes, Cartridges and Ammunition, Axes and Saws, and other committees on other lines will be appointed soon. It is expected that desirable results will follow from the conferences between manufacturers and jobbers, which will be an interesting feature of the approaching gathering.

**WHITMAN & BARNES MFG. COMPANY** are about to close their Canton, Ohio, shops and consolidate the business formerly done there at their Akron, Ohio, factories. Some of the goods made at Akron formerly will hereafter be manufactured at their works at West Pullman, near Chicago, as was contemplated when the Pullman plant was erected.

### Opening of the Hardware Club.

**FORMAL ANNOUNCEMENT** is made that the rooms of the Hardware Club of New York in the Postal Telegraph Building, corner Broadway and Murray street, are at length furnished and ready for occupancy. They will be open for the inspection of members and their friends on Thursday, May 31, from 11 a.m. to 5 p.m., and on Friday, June 1, the club will be in regular operation, and it is expected that it will be found a very convenient place for dining and luncheon, giving the members an opportunity to meet one another, while it will also furnish facilities for business conferences, meetings of associations, &c.

In view of the interest and importance of the event, it is hoped that there will be a large attendance of the members and their friends next Thursday. It will be especially pleasant for the trade in the city if a goodly number of the out of town members should be present and mark the inauguration of what promises to be a most successful and influential enterprise.

### Manufacturers' Association of Kings and Queens Counties.

**THE MANUFACTURERS' ASSOCIATION** of Kings and Queens counties held their last regular monthly meeting before the fall at the Pouch Mansion, Brooklyn, May 21. A report from the Committee on Legislation was adopted, petitioning Congress through the New York Senators and Representatives, requesting speedy and definite action by that body on the pending tariff bill. This report disapproves of the lines laid down in the Wilson bill, deprecating the extremes of legislation, and favoring the passage of such moderate tariff laws as savor neither of free trade nor extreme high protection. In this petition are embodied the following figures compiled from the Government census of 1890 soon to be issued. In the counties of Kings and Queens, which this association represents, there is as much invested and as many establishments as in 15 of the smaller States and Territories, aggregating 240 separate industries, with 10,561 manufacturing establishments, employing 114,000 persons (of whom 80,000 are voters), with an invested capital of \$131,455,000, paying yearly in wages \$67,713,764, with a yearly product valued at \$266,000,000. This petition is to be presented as from a non partisan organization representing the great industrial interests of a locality said to stand second in America in the variety, volume and value of its manufactures.

C. N. Chadwick, one of the directors, will go before the State Constitutional Convention with a memorial asking the attention of that body to several moral and economic suggestions for incorporation in the revised Constitution. Twenty-nine new members were admitted. Reports of progress were made from the Committees on Insurance, Express and Information. The directors will meet during the summer when necessary to pass on

applications for membership. The rooms and offices will be open continuously through June, July and August for the use of the members, with the secretary in constant attendance.

## Relations Between Jobbers.

*Concluding portion of an address before the Hardware Merchants' and Manufacturers' Association of Philadelphia.*

BY WILLIAM W. SUPPLEE.

I THINK we all admit one fact: whatever is to the interest of one jobbing house is of corresponding interest to other jobbers in the same city. Each may have different and varied ideas of business, whether to engage his salesmen upon a system based upon his sales or upon a stipulated yearly salary; whether to have salesmen on the road or confine their business to sales made under their own roof. But there can be nothing in the manner of doing business which should prevent the relations between jobbers themselves being of the most pleasant and even social character, not only in our own city, but between themselves and jobbers of other cities.

Some of my most delightful acquaintances are members of firms of jobbing houses throughout the country. The social entertainments given by members of our association remain as bright stars in the horizon. The occasional banquets given by our association, I think, have not been surpassed even by those of the celebrated Clover Club, which has a national reputation for their pyrotechnical display of wit and wisdom.

As a city our business men, in the various branches of trade, are far more liberal and socially inclined to each other than they were a few years ago. I do not believe that any house in our city conducts their business with the one idea to excel in volume that of his neighbor. Indeed, there are houses in our own city who would rather not extend their business beyond its present dimensions. Others may have a desire to conduct their business so as to reduce their general expense account to the lowest minimum point.

Unfortunately, however, I fear we are occasionally influenced by tradition. I remember being told some years ago by a member of our association that he had complained to a competitor (now out of trade) because he had quoted prices below the market, and especially low to some of his customers. "Why," said he, "you should not complain. I have had more trouble in taking your customers than those from any other house in our city."

But the energetic seller now has a huge barrier which prevents indiscriminate cutting. It is the question of profit or loss which stares him in the face. The margins of profit are not only now very much smaller, but the expense of doing business greatly increased. Nor can I see how the expense of doing business can be much reduced. The force employed are now none of them too well paid.

We admit in each large city a limited few houses have always confined their principal efforts to the near local trade, who visit the market with regularity as in former years, and are seldom, if ever, visited by their salesmen. But

the traveling salesmen have come to stay, and the railroad companies are not likely to reduce their fares in order to reduce the expense of that system.

But there are evils in the system which can be corrected through more intimate relations between each other. We all concede the fact that none of us can have an iron clad rule in prices to all customers, who sell Hardware, alike.

There are different grades of customers. Some with a moderate amount of capital who buy in small quantities, and the most vigorous system you may adopt for collecting your accounts will not avail to hold them to the terms of the sale; while in the same city you may have a customer who buys in sufficiently large quantities which will even permit him to sell at wholesale such customers as the one referred to, and which will entitle him to the lowest possible prices, who never exceed your terms of payment, and in case you request him to make remittance by a certain date to have the same available for your own requirements, you will find a check for the amount on your desk on the date named.

Under the present system of doing business, your salesmen are given prices according to your views to meet both cases. To the one your regular selling price and to the other a special price, which affords you but an infinitesimally small margin of profit.

No injustice is done to either customer. The old adage, "one man's dollar is as good as another's," is all right as far as it goes, but one man's dollar is not as good as another man's thousand dollars.

Following your salesman comes a salesman from another house. This salesman, through accident, or perhaps carelessness of the buyer, may have seen your invoice, or perhaps No. 2 desires some goods, and he makes a price at which he has bought before. The salesman meets the price, and, having seen the invoice, uses the same price to his next customer, who, for reasons above given, may not be entitled to the special price, any more than the second customer may be entitled to the price from the manufacturer which you, as jobbers, are paying. Your salesman writes he saw an invoice giving you the price as the market or regular price. Or go further: you permit a change in your price from an isolated case reported to you, thus leaving it to your salesman to regulate prices for you.

The next customer he visits may, from a defective memory, without referring to his invoice, name a price at which some other house has sold him, or through an error on the part of the salesman, or even a clerical error in an invoice may have occurred, which, although discovered later and the same corrected, your salesman may have already met this price, and thus a special price or an erroneously reported price, or even a clerical error, may become an almost regular price.

It is to the interest of our salesmen to sell goods, as well as to the interest of the house to have them do so, and I regret to say we have all known cases where self interest has induced a salesman to "kick up in order to hide himself in his own dust." In this connection we can all refer to instances where, to put it mildly, a salesman has either been affected by astigmatism of the eyesight when he has seen the invoice, and perhaps not seen the proper date of invoice, and perhaps not the proper price. In other cases his memory may have been at fault, and between the time he saw or heard the price it had changed from a 5 per cent. to 10 per cent. before the information reached his own house.

Evidently a salesman of this kind requires treatment of some kind. A

physician may be necessary, or perhaps the house, by proper treatment, may be able to effect a cure; but if he be permitted to "hew to his adopted line, let the chips fall where they may," occasionally a chip may fly back and hurt where least intended.

Far be it from me to make use of these abuses in general terms. I believe it to be the aim of each house to have salesmen of the highest grade of character and integrity, and in this they are generally successful. As a rule the salesmen who represent houses in our city are above suspicion of any acts of the kind referred to, but on the contrary are intelligent, reliable, honorable and conscientious.

We all realize there are but few instances where any one house can monopolize the entire trade of any one or more of their customers, although many houses naturally have their preferences, either from associations of long standing or otherwise.

If our relations were such that we could feel free to call upon each other, where cases of irregularities were reported to us, many of the evils referred to could be corrected, and I do not believe that any of our members would soil their reputation by a breach of faith in more intimate and even social relations.

## Letters from the Trade.

**A Question.**—We take pleasure in submitting to our readers the following inquiry, which comes to us from a prominent manufacturing house:

Will some of your expert correspondents who are bookkeepers answer the following to settle a dispute?

A company keep a drayage account, into which all entries—horses, wagons, feed, harness, &c.—are entered for purpose of ascertaining cost of the department separately. A horse valued at \$200 dies. Should drayage account have credit for this at once, or should it be carried from the account in settlement of books at end of year?

DISPUTANT.

**About Circulars.**—We are in receipt of a communication from a traveling salesman in which he refers to the desirability of printed matter from manufacturers being in shape adapted to use in catalogues, as follows:

I travel on the road selling Hardware. I have a catalogue in which I take a great deal of pride in its cleanliness and general attractiveness. From time to time I get cuts and prices of new goods. These cuts come to me in all sorts of shapes and colors. I do not object to the colors or their attractiveness, but none of them are in the right shape to enter in a catalogue of any of the different houses. They are too long or too short, too wide or too narrow, and entirely unsatisfactory. A few days ago I got a very flashy and beautiful cut of a Pump Oil Can, but to get it in the catalogue I was compelled to cut the advertising matter, explanations, &c., all off and put it in with its bottom toward the center of the catalogue—lay it on its side.

To-day I got another one called the Midway. It is a very flashy Can and has some good points, but the printed matter relating to the good points I had to cut square in two. Then it did not look at all well. How attractively it might have been placed in any catalogue had it been put in the center of a sheet large enough for the largest catalogue made, lined around the edge so that it might have been trimmed to suit any of the smaller ones, and would have looked equally as well in one as the other. Printed matter could be



wide enough only to fit the smaller ones. It would then fit all of them. New goods are constantly coming to us this way.

When a manufacturer makes a new article he wants it introduced in the best manner and the quickest possible way. If he would do as above mentioned—put it in the center of a sheet large enough to cut to fit any catalogue—he would be doing himself more good than any one else. Even the smallest articles could be arranged this way—a pair of Pinchers, a Pipe Collar, a Flue Stop, a Barn Door Hanger, a Lock, Latch, or anything else.

### Trade Items.

**A**MONG the new goods illustrated for the first time in the catalogue of the E. D. Clapp Mfg. Company, Auburn, N. Y., referred to in our last issue are the following:

Banner Axle Clips.  
Double Perch Ends, swedged pattern.  
Head Block Braces.  
Brewster Gear Irons.  
Front Axle Steps.  
No. 3 Foot Rails.  
Canopy Top Standards.  
Dayton Standards.

The catalogue shows an exceptionally complete line of goods used in ironing top buggies, phaetons and surreys.

THE REMAINS of the late L. A. Schoeninger, president of the Western Wheel Works, who died in Switzerland April 26, arrived in Chicago for burial on May 12.

THE CHAMPION SELF HEATING FLAT IRON COMPANY, Sheidley Building, Kansas City, Mo., are putting on the market the Champion Self Heating Flat Iron, the interior of which has a tube burner perforated with small holes, which is fed with gas from the handle. The iron is referred to as working on the principle of a gasoline stove. It is quickly adjusted and the cost of operating it is said to be little more than nominal.

KENTON LOCK MFG. COMPANY, Kenton, Ohio, issue a circular in which they enumerate the letters patent on Refrigerator Locks and Latches of which they are sole owners, and state that they have applied for other patents which are now pending, intimating that every valuable device connected with their Refrigerator Trimmings is covered by the above and that infringements will be prosecuted.

ARTHUR A. THOMPSON, 45 Kilby street, Boston, has been appointed agent for the Eastern States for the sale of Tin Plates made by Meurer Bros. Company, Brooklyn, N. Y. He will also carry a full line of the Sheet Iron and Metals made by them.

OUR ATTENTION has been called by the Simonds Mfg. Company, Fitchburg, Mass., to the fact that the daily papers last week referred to the financial embarrassment of a concern of almost identical name, with offices in New York and Chicago. This has given rise to inquiries in different parts of the country as to whether or not their house had been overtaken by financial difficulties. At their request we take pleasure in stating that they are in no way connected with the other company, are in most successful operation, and, with their newly equipped Chicago factory, are in a position to take care of orders from their customers in any part of the country.

### Spalding Bicycles.

**A.** G. SPALDING & BROTHERS, New York, Chicago and Philadelphia, as special agents for the Lamb Mfg. Company, Chicopee Falls, Mass., are handling a line of Spalding and Credenda Bicycles. The line of wheels shown in their catalogue includes the Spalding, weighing 27 pounds, listing \$125; Credenda Pacer, weighing 36 pounds, listing \$100; Credenda Consort, ladies' wheel, listing \$100; Credenda Roadster, weighing 33 pounds, listing \$85; Credenda Pacer Junior, weighing 30 pounds, listing \$65, and the Credenda Consort Junior, listing \$75.

### Price-Lists, Circulars, &c.

**G**OODSELL COMPANY, Antrim, N. H.: Apple and Potato Parers, Cherry Stoners, Seed Sowers, &c. An illustrated catalogue and price-list shows a varied line of these goods; also Can Openers, Hammock Chairs and Carriage Wrench. In addition to the goods illustrated in the catalogue the company manufacture a large line of Cutlery, including Table, Butcher, Shoe and other Knives.

SYRACUSE ARMS COMPANY, Syracuse, N. Y.: The Hollenbeck Hammerless Gun. A circular illustrates the parts of lock and locking device, also the Gun complete. The principle features of the Gun are its simple construction, safety mechanism, fore end fastener, &c.

EMPIRE FORGE COMPANY, Lansingburgh, N. Y.: Empire, Western and Universal Portable Forges. In addition to the foregoing are shown Empire and Western Tuyere Irons, Hand Blowers, Small Blowers, Sash Pulleys, Sash Cord Fasteners, Metal Daubers, &c.

W. N. DURANT, Milwaukee, Wis.: Combined blotter and calendar for May, advertising Durant's Counters.

ELECTRIC GAS LIGHTING COMPANY, Boston, Mass.: Electrical Appliances. An 1894 catalogue and price-list of 79 pages shows Gas Lighting Devices, Cut Outs, Keys and Pushes for Automatic Burners, Samson Batteries for which the company are sole manufacturers' agents for the United States, Batteries and Battery Supplies, Electric Bells, Annunciators, Pushes, Electric Locks, Door Openers, Electro Medical Batteries, Tools for Electric Work, Telegraph Instruments, Fan Motors, Porcelain Cleats and Insulators, Telephone Supplies, Speaking Tubes and Supplies, &c.

BLAIR HUSKING GLOVE COMPANY, Bucyrus, Ohio: Husking Pins and Gloves. An 1894 catalogue and price-list illustrates five styles of Gloves and three styles of Pins. The makers remark that they are now strictly in the Husking Glove and Pin business, and that they propose to turn out the best goods for the money in the market.

M. GOULD'S SON & Co., 105 Duane street, New York: Trunk Makers' Materials. An appendix of 20 pages to their illustrated catalogue shows many new patterns of embossed Trunk Coverings, Corners, Valance Clamps, Handle Loops, Corner Rollers and Hinges; also a variety of Reverse Clamps, Sample Case and Coat Case, Catches, &c. They also offer an improved Trunk Bolt, recently patented, which is made to match solid bronze trimmings, and can also be had in brass plated, tinned and japanned. It is so made that it holds the front of the cover firmly and securely in place.

BROOKLYN LOCK COMPANY, Brooklyn, N. Y.: Locks, Latches, Springs,

&c. A circular illustrates a line of new cheap Night Latches, made under an entirely new principle, for which they have patents pending.

ECONOMY FOUNDRY & MACHINE COMPANY, Syracuse, N. Y.: Ornamental Iron Work, Specialties, &c. Catalogues illustrate Iron Stable Fixtures, Cresting, Building Columns, Window Sills and Caps, Reservoir Vases, Iron Settees and Chairs, Sewer Catch Basins, Economy Steel Single Track Parlor Door Hanger, Saw Vises, Little Giant Truck, &c.

THE NEWHALL & PHIPPS COMPANY of New York City have been incorporated, with a capital of \$40,000. The company will manufacture Hardware. The directors are H. B. Newhall, C. L. Phipps and Herbert C. Whipple, all of New York.

ROBERT J. MASBACH, 80 Vesey street, New York, who wholesales and retails Hardware and House Furnishing Goods, has made a study of economizing room and utilizing all his space. The street floor is fitted with shelving and racks to hold samples and a portion of small wares, sufficient aisle room being left. Tickets with numbers and prices running as the goods do are tacked under the goods on the shelving. This system is duplicated in the lofts above where stock is stored. By this means it is apparent when goods are out. Much of the Cutlery, Cleavers, &c., is kept in drawers, in compartments built for each size, while tools and bright goods are kept in bins in plain view, protected by glass doors.

### It Is Reported—

#### Illinois.

That the Hardware store of J. A. Oliver of NEW MEMPHIS was robbed on the 7th inst. of \$50 worth of Cutlery.

That the Brookline Hardware Company of CHICAGO have been incorporated, with a capital stock of \$12,000. The incorporators are Alfred E. Frost, C. A. V. Standish and C. W. Nothnagel.

That the Hardware store of F. B. Rice, AURORA, one of the oldest and best established stores in that city, has been closed by the sheriff on three judgment notes, aggregating over \$10,000, held by the Second National Bank. Among other heavy creditors are Hibbard, Spencer, Bartlett & Co. of Chicago.

#### Indiana.

That the Implement warehouse of Fogle & McCarty, LAPORTE, was destroyed by fire on the 12th inst. The fire is thought to have been of incendiary origin.

That William Brummitt & Son's Hardware store at NEW CARLISLE was burglarized on the 7th inst.

#### Iowa.

That W. D. Rust has purchased a stock of Hardware at CEDAR RAPIDS and has opened up a Hardware store.

That E. W. Joy has disposed of his Hardware business at WAPELLO to a new firm under the style of Hayden & Bettler.

That the store of Samuel Lemley of MELROSE was robbed on the 7th inst.

That Ferman & Kingsbury, CRESTON, have sold out to and been succeeded by Mr. Kingsbury, who will continue the business alone.

That E. S. Welch has succeeded Welch & Lazenby in the Hardware business at OTTUMWA.

#### Kansas.

That the business portion of the town of NORTONVILLE sustained a serious loss from fire on the 14th inst. Among the heaviest losers was C. O. Johnson, dealer in Hardware.

That \$300 worth of Hardware was stolen from the store of the Hamilton-

**Rankin Hardware Company, ARKANSAS CITY,** on the 8th inst.

That A. Sellers is now conducting the Hardware business at McPHERSON formerly carried on under the style of Sellers & Wright.

#### Michigan.

That John Klooster of MUSKEGON is intending to open a new Hardware store at FREMONT.

That Knight & Decker, at GRAND HAVEN, have been dissolved, Isaac Decker succeeding.

#### Minnesota.

That Dickinson Bros. of VERDALE will build a large two-story pressed brick structure at WADENA, which they will occupy on completion as a Hardware and furniture store.

That Foss & Hoode have recently entered the Implement business at St. JAMES.

#### Nebraska.

That H. G. Stilwell's Hardware store at PALMYRA was destroyed by fire on the 14th inst.

#### New York.

That the Hardware store of Charles G. Hornung, 411 William street, BUFFALO, was visited by burglars on the 9th inst., who carried away a small quantity of Revolvers, Knives, Drills, &c.

That P. B. Cary of DUNKIRK will remove his Hardware stock to new quarters on July 1.

That the Hardware store of Alexander Ferguson of CHARLOTTE was robbed on the 13th inst. Two hundred dollars' worth of Cutlery was secured by the thieves.

That Alling, Fields & Co. is the style of a new Hardware firm at DUNKIRK who expect to engage in business about July 15.

That John W. Petry, for many years the manager of William Brodie's Hardware store at LONG ISLAND CITY, has engaged in business on his own account, having formed a copartnership with John A. Halpin (also until recently connected with Mr. Brodie), under the style of John W. Petry & Co. They have leased the building 63 Vernon avenue. Mr. Petry was also for a long period manager of the Hardware and plumbing business of his uncle, the late George Petry. The new firm will do a general Hardware and plumbing trade.

#### Ohio.

That Thomas Bodell's Hardware store at HARROD was robbed on the 8th inst.

That Henry Morris' Hardware store at 436 Woodland Avenue, CLEVELAND, was entered by burglars on the 8th inst., and \$52 worth of Knives and Razors stolen.

#### Oregon.

That Mrs. John P. Faull has retired from the Hardware firm of Basche & Co., BAKER CITY.

#### Pennsylvania.

That Swoope & Lloyd, dealers in Hardware, PHILADELPHIA, have sold out to W. H. Lloyd.

That when the powder house of the LANCASTER Hardware firm of Diller & Sons, located near the city limits, was opened on the 19th inst., three rifle balls were found lying just within the doorway, and an examination of the door itself, a heavy one of wood, lined inside and out with sheet iron, showed where they had entered. They had just penetrated the door and then fallen to the floor, but had they gone a few inches further they would have dropped among several tons of dynamite and 300 kegs of powder which were stored in the building. It is believed that the person who fired the balls into the building stood off some distance, at what he considered the safety line, and fired in the expectation of setting off the explosives in the

building, his only object being a desire to see the result.

#### Wisconsin.

That E. M. Chandler and S. D. Spiedel have entered into partnership at RICHLAND CENTER and will conduct the Hardware business at the old Chandler stand. The firm name will be Chandler & Spiedel.

That R. I. Lewis is the proprietor of a new Hardware store at BRANDON.

*The Hardware trade throughout the country are requested to report business changes, improvements and other matters of trade interest suitable for mention in this department.*

### Paints and Colors.

*It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.*

**White Lead.**—Jobbers and grinders have purchased Dry Lead in moderate quantities only. The majority seem to be supplied from stock received on old orders. This movement takes up a considerable portion of corrodors' current output, but enough surplus is left to keep competition lively and prices more or less unsettled. It is no difficult matter to buy round lots at prices as low as any that have ruled during the past month or six weeks. Lead in Oil has met with moderate sale in a jobbing way, and the movement is represented as being well up to the average for the season despite unfavorable weather the past few days for outdoor work. Prices have undergone no radical change.

**Red Lead.**—Dealings have been moderate all told and confined chiefly to rather small lots for immediate delivery. The largest consumers are well stocked. Prices for both American and foreign brands are still somewhat irregular, but have not changed materially during the past week.

**Litharge.**—Low grades continue to meet with fairly brisk sale for delivery this month and next. The better qualities are in only moderate demand, and the business passing is chiefly of a jobbing character. Prices remain about as they were last week.

**Orange Mineral.**—Sales are of about the same general character as for some time past and barely up to the average for this season of the year. The inquiry is also very commonplace. Prices still lean somewhat in buyers' favor.

**Zincs.**—In the market for American Oxide no radical change has taken place, but the undertone is rather weak, owing to generally tame demand and competition due partly to lower cost of crude material. Cash buyers of large lots could probably secure concessions of  $\frac{1}{8}\phi$  @  $\frac{1}{4}\phi$  from popular quotations. Foreign stock is in slow demand and sells at practically the same prices that have ruled for several weeks.

**Colors.**—The trust list prices for Paris Green have been advanced as follows: Bulk, in arsenic kegs or casks, 23¢; in kegs of 100 to 175 lb, 23 $\frac{1}{4}\phi$ ; 14, 28 and 56 lb kits, 25¢; 2 to 5 lb paper boxes, 25¢; 1-lb boxes, 25 $\frac{1}{2}\phi$ ;  $\frac{1}{2}$ -lb, 27 $\frac{1}{2}\phi$ , and  $\frac{1}{4}$ -lb boxes, 29 $\frac{1}{2}\phi$ . The rebates continue as before, viz.: On 500 to 1000 lb, 1¢; on 1000 to 2000 lb, 1 $\frac{1}{2}\phi$ ; on 2000 to 4000 lb, 2¢; on 4000 to 10,000 lb, 2 $\frac{1}{2}\phi$ , and on 10,000 lb or over, 3¢. Terms 60 days, with 6% discount for unexpired time. Prices for Carmine, No. 60, have undergone no further change, but the market is very unsettled and irregular. In other dry Colors the situation is unchanged except to the extent that sales are slower. Oil Colors have met with quite good sale, as have ready mixed Paints, and there is little complaint except over the lowness of prices.

### Oils and Turpentine.

**Linseed Oil.**—City crushers have reduced their price for Calcutta raw Oil to 54¢ but keep the quotation for American seed Oil at 52¢. The explanation of the change is that American seed Oil satisfies the wants of a large portion of dealers and consumers to such an extent that the Oil made from imported seed will not be taken at the late premium. Regarding outside competition nothing new has developed, and at present it is doubtful if purchases can be made at less than 50¢ for prompt or future delivery.

**Cotton Seed Oils.**—Speculation has remained lifeless. Consumers and exporters have purchased very indifferently. The offering has been very moderate also, and, upon the whole, the market presents a very dull appearance. It is remarkable, however, that prices have undergone hardly any change despite the more or less unfavorable surroundings.

**Lard Oil.**—Prices have weakened somewhat, or to about 59¢ @ 60¢, for prime stock in round lots. The change is due in part to weakness of the market for raw material, but helped in some degree by the fact that the demand for Oil is rather slower than usual at this season of the year. Low grades may be purchased at some concessions, although former prices are generally asked.

**Fish Oils.**—No changes have taken place in crude Menhaden, Whale or Sperm Oil prices, and the market is quite bare of new feature, there being only tame buying interest. Sales of the Pressed and Bleached Oils are fairly up to the average, and prices remain quite steady.

**Spirits Turpentine.**—Business has been somewhat more liberal, although not above the average for the season, and prices are quite firm at 29 $\frac{1}{2}\phi$  @ 30¢ for regular and 30¢ @ 30 $\frac{1}{2}\phi$  for machine barrels.

### Linenoid Boats.

Henry C. Squires & Son, 20 Cortlandt street, New York, are handling the Linenoid seamless boats and canoes, built by Crane Bros., Westfield, Mass. We are advised that the boats are made of a comparatively new material, the base of which is linen. The pulp is shaped over a form and water proofed, and being of but one piece, is literally seamless and of a consistency said to resemble brass as to strength and flexibility. The trim is of ash and oak. The interior construction of the boats is referred to as new, the floor boards and seats being supported on ash ribs bearing on gunwale and keel only, thus relieving the shell of the boat of all wearing strain. The fastenings throughout are of brass, no iron being used. In the bow and stern of rowboats are fitted rattan chairs with backs suspended from the wood frame work. Many of these boats are carried in stock, and among the kinds made are open and deck canoes, hunting boats, sneak boats for duck shooting, paddling and sailing canoes, pleasure rowboats, &c.

### Leather Handle with Snaps.

M. Gould's Son & Co., 105 Duane street, New York, are offering a very convenient and handy leather bag handle with snap catches at each end. It is made of black leather similar to those permanently attached to hand bags, but with nicked snap catches  $1\frac{1}{2}$  inches long, so that it can be instantly attached or detached from parcels, wraps or any of the numerous hand packages carried by travelers and shoppers. They are made in two sizes and sold in the trade by the gross.

### Electrical Telephones.

Manhattan Electrical Supply Co., 36 Cortlandt street, New York, are offering telephone outfits as illustrated herewith, as it is stated that on January 30, 1894, the fundamental patent

battery. The construction of the telephone receiver is extremely simple, consisting essentially of only three parts—a permanent magnet (steel bar), coil of fine insulated wire and a diaphragm—contained in a suitable case. As long as the steel bar retains its magnetism and the diaphragm is in proper adjust-

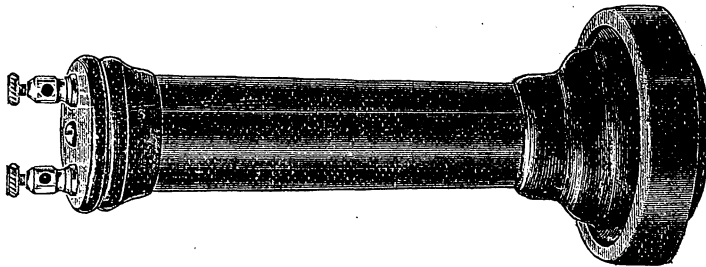


Fig. 1—Telephone Receiver.

covering broadly all forms of electric telephones expired. The following explanation of the construction, use and retail price of the telephone outfits illustrated will give our readers a com-

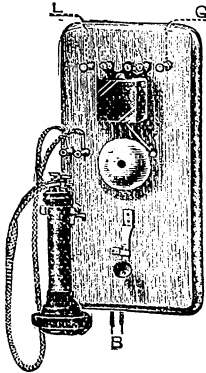


Fig. 2—Telephone Outfit No. 5.

prehensive idea of the requirements and expense of private telephone lines.

At the present time, we are advised, the standard telephone receiver or hand

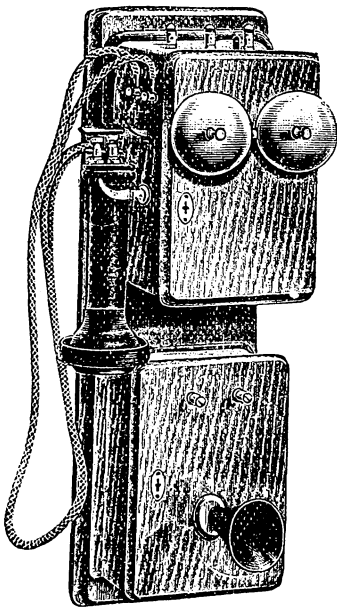


Fig. 3—Telephone Outfit No. 3.

phone, Fig. 1, can be bought outright for \$1 each. The telephone receiver can be used for a transmitter, and will transmit articulate speech over a single wire with excellent results a distance of 10 miles or more without the use of a

ment the receiver can be relied upon to do good service. The receiver is made up after the pattern of the standard receiver, which has compound magnets (four magnets), Fig. 1 representing the form in general use. The instrument works very satisfactory on lines 2 or 3 miles long, but it is necessary to have some means of signaling, to attract the attention of a person at a dis-

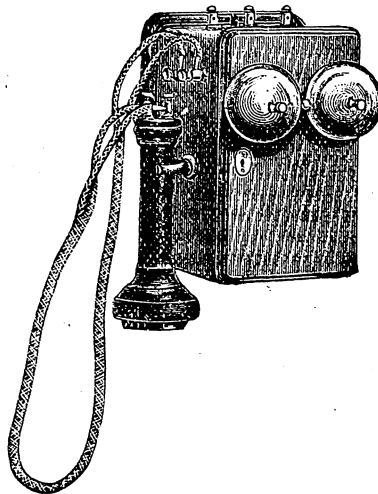


Fig. 4—Telephone Outfit No. 1.

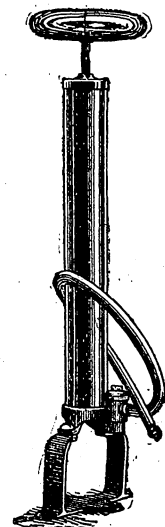
tant station. The apparatus employed for this, which is in general use, is the magneto bell, operated by turning a crank, which generates an electric current that rings the signal bell at the distant station. These bells are quite simple in construction and not easy to get out of adjustment or order. The crank is attached to a cog wheel that fits the gears of a small wheel on the armature. The armature is of soft iron and carries two coils of fine insulated magnet wire, and is suspended in fixed bearings between a U shaped permanent magnet. When the armature is revolved a current is generated, the strength of which varies according to the size and amount of wire used on the coils. Bells for ordinary use will ring on lines up to 25 miles in length, and cost at retail about \$7. The cheapest outfit, including a telephone and signal, where no battery is used, is shown in Fig. 4. The hand phone is used for a transmitter as well as receiver, making it necessary to change alternately from mouth to ear when carrying on conversation. This style of instrument is easily connected to the line, which may be a single wire with connections to the earth at either end or two wires, generally known as a "metallic circuit." For

lines up to 4 or 5 miles in length any kind of line wire can be used. No. 12 is a standard size and copper is the best conductor; but the cheapest market iron wire gives good results when properly fastened to and insulated with glass or porcelain insulators, which can be bought at a nominal figure. Telephone outfits with magnetic mouthpiece transmitters, as shown in Fig. 3, give better satisfaction and are more convenient for use, as it is not necessary to remove the receiver from the ear while carrying on conversation, and the transmitter having more powerful magnets than the receiver, they can be operated on much longer lines. If confined to lines within a radius of five miles, the magnetic telephones are a success except where they are to be used in extremely noisy places or where the line wire runs close to and parallel with electric light or power wires. At present long distance or battery transmitters are not being sold, as they are covered by a number of patents. No knowledge of telephonic science is necessary to construct and maintain magnetic telephones, neither is it necessary to secure the services of an electrician. Any person of ordinary intelligence can erect lines and adjust instruments as well as the most expert electrician. Complete instructions are furnished with telephone outfits.

For short lines or for connecting different departments in buildings an ordinary electric bell which is operated with a battery, as shown in Fig. 2, will answer every purpose for a signal. The outfit shown is one of the cheapest on the market—retails for about \$5. This price includes batteries, which are connected to the two wires at bottom of backboard, as shown in illustration.

### The Cyclone Pump.

The Davis & Stevens Mfg. Company, Seneca Falls, N. Y., are putting on the market the bicycle pump here shown.



The Cyclone Pump.

The pump cylinder measures  $1\frac{1}{2} \times 12$  inches, nickel plated, provided with a turned brass plunger,  $\frac{1}{4}$  inch thick, and with a cupped plunger leather so, it is stated, that it does not cut out the cylinder. The pump has a base of malleable iron, by which it may be held by the foot or screwed to the floor. The base is attached to the pump by bolts and nuts, and may be easily detached for close packing or when carrying the pump on the wheel. With the pump

is furnished a small hose, with a coupling to fit all nipples, or larger hose with a thumb screw coupling to fit all tire valves without using any nipple. The point is made by the manufacturers that the pump is strong, durable, convenient and cheap.

#### Sperry Serrated Edged Knives.

Charles F. Sperry & Co., St. Louis, Mo., for whom Bronson & Near, Cleveland and New York, are sole agents, are introducing serrated edged bread, cake, paring and coring knives, as herewith

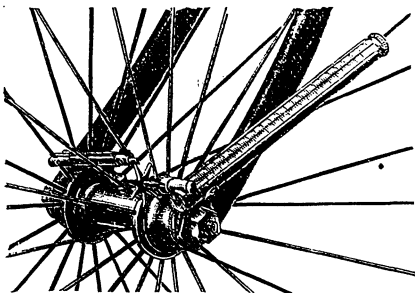


*Sperry Serrated Edged Knife.*

shown. It is explained that the serrations in these knives are deep and shallow, short and long; the short, shallow teeth doing the principal cutting, the long, deep serrations preventing any possible clogging and tearing. In other words, it is remarked, uneven serrations do the work more easily and much smoother, upon the same principle that a serrated or saw edge knife will cut hot bread or cake better than a common knife. The knives are made with straight and curved blades, the curved blade being recommended by the makers as superior for cutting bread or cake, as the center of the blade strikes the bottom of the loaf or the top of the bread board first, making as clean and perfect a cut at the bottom of the loaf, without tearing, as at the top. The manufacturers state that the knives are made from crucible steel, finely tempered, and that they will not only retain their shape but will hold a perfect cutting edge. The knives are sold in sets, set No. 1 containing 1 each bread, cake and paring knife, straight blade; set No. 2 containing the same assortment with curved blades.

#### The Hall Cyclometer.

The accompanying cut shows a bicycle cyclometer being introduced by the Hall Mfg. Company, Wallingford, Conn. The cyclometer consists of a nickel plated tube. The device, it is



*The Hall Cyclometer.*

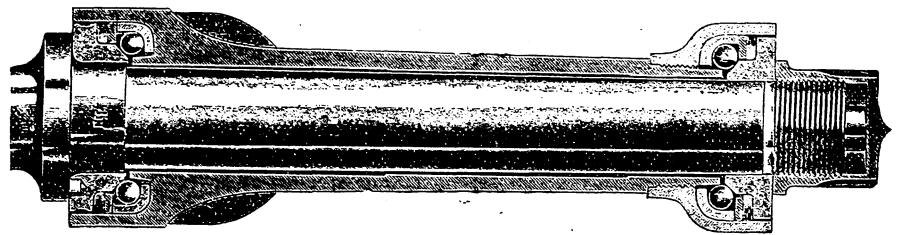
stated, weighs but 3 ounces. The mechanism consists of a screw across a worm gearing contained in the tube. The worm gear turns a threaded rod, also within the tube, upon which is a nut, and as the nut is so arranged that it cannot turn, it moves up the rod. The tube has a slot running nearly its entire length, the opening being covered by a transparent gauge, upon which are two sets of graduations, one on each

side of a line running lengthwise of the gauge. One set of the graduations are for a 30-inch wheel and the other set for a 28-inch wheel. The nut travels directly under both the graduations, so that whether riding a 30-inch or 28-inch wheel, the graduations designed for that particular wheel may be ready. This feature is referred to as a very desirable one for dealers, as it obviates the necessity of carrying two sizes of cyclometers in stock. The point is made that there is not a wheel, dial, hand or spring in the device, and that any boy can take it apart in a minute, clean it and put it together again. It

is explained that the cyclometer registers 100 miles on a 28-inch or 30-inch wheel without any change; that when the nut gets to the end it is but the work of a minute to set it at zero again, and that the cyclometer has nothing delicate about it to get out of order.

#### The Imperial Ball Bearing Carriage Axle.

The application of ball bearings to the axles of vehicles has been tried by numerous inventors with varying degrees of success. The chief difficulties encountered in attaining commercial results have arisen from the necessity of using special boxes or from the weakness of wearing parts in the effort to avoid cumbersome construction. A new ball bearing axle styled the Imperial, which has been brought out by Kelly, Maus & Co., 184 to 190 Lake street, Chicago, is claimed by the manufacturers to have overcome all the objectionable features referred to and to furnish carriage builders with an article they have long desired. The accompanying cut is a sectional view of an Imperial axle, laid open from nut to shoulder. It is simple in construction,



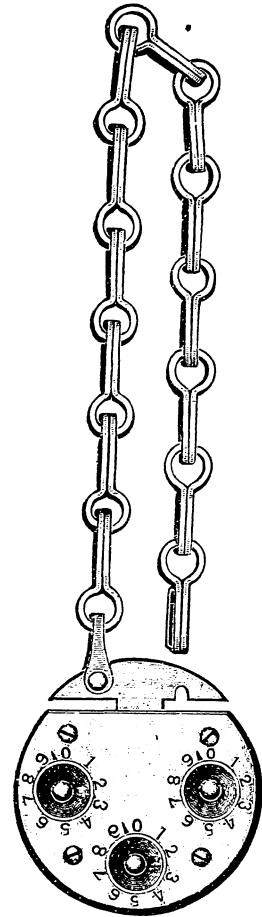
*The Imperial Ball Bearing Carriage Axle.*

the box being similar to the half patent box, so that the wheel can be boxed in the old manner. It is so simple that it can be used for any kind of wheels and for old or new work. The inside of the collar, which is the breaking point, is  $\frac{1}{4}$  inch larger than the bed. The wearing parts are carefully hardened and thoroughly fortified. The cones on either end and the inner cups or races are made of the finest steel, with the cone locked securely, so that the rotation of the balls cannot disturb the nut. The balls used are turned cold from the finest drill rod steel and have been most severely tested. The relative parts of the ball bearing action are accurately adjusted. The nut is of an original and very ornamental design. All parts are interchangeable and any part can be duplicated from the manufacturers at

once. Four sizes are made at present, from  $\frac{3}{4} \times 6\frac{1}{2}$  to  $1\frac{1}{8} \times 7$ , for general buggy work and light surreys.

#### The New Permutation Bicycle Lock.

Hall Mfg. Company, Wallingford, Conn., are offering the keyless bicycle



*The New Permutation Bicycle Lock.*

lock here shown. The lock is the size of a silver half dollar, and weighs, it is stated, including the chain, one ounce.

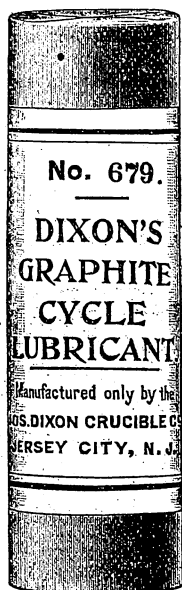
There are 999 possible changes of combination, and the manufacturers claim that the lock is simple in construction and that it is impossible to pick it. The cut represents the lock as being open; in closing the chain is slipped into the notch and the keeper pushed down.

THE UNDERWRITERS' FIRE SPRINKLER COMPANY, manufacturers of the Pierce system of Automatic Sprinklers, have removed from 315 Dearborn street to Room 1141 Monadnock Building, Chicago. O. Pierce is vice-president and general manager.

DABNEY & WEEKS, agents of the Atlas Tack Corporation, have removed their warehouse and salesroom from 241 Lake street to 193 Lake street, Chicago.

### Dixon's Solid Graphite Cycle Lubricant.

Joseph Dixon Crucible Company, Jersey City, N. J., are offering a cycle lubricant in solid stick as shown herewith. The full sized cut represents the lubricant covered with tinfoil, appro-

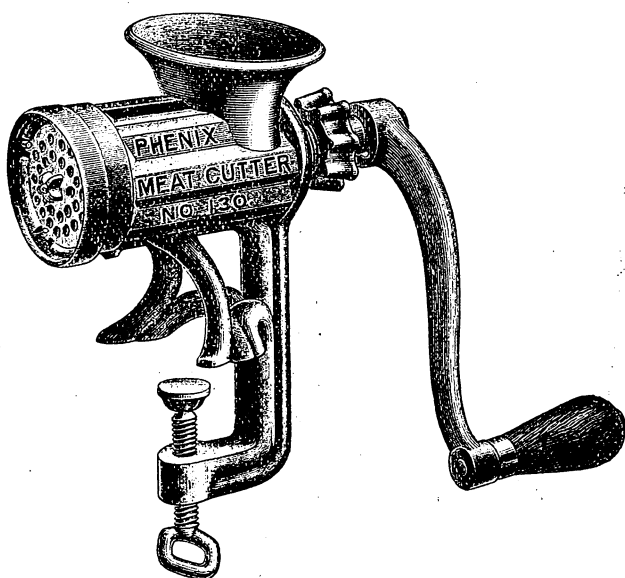


*Dixon's Solid Graphite Cycle Lubricant.*

priately labeled. This is inclosed in a cylinder shaped wooden box, with removable top. The manufacturers state that in the stick form they make use of a peculiarly rich and smooth graphite, selected from the large and choice stocks at their command, and that its occasional use will save wear of a chain and greatly add to the ease of running.

### Phenix Meat Cutters.

Sargent & Co., 37 Chambers street, New York, are introducing their galvanized Phenix meat cutter as shown in the illustrations herewith. The

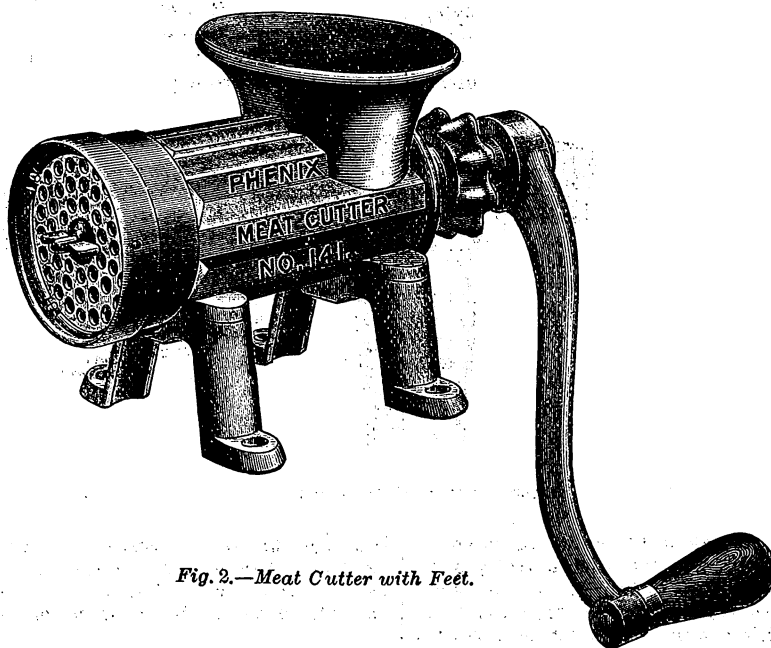


*Fig. 1.—Meat Cutter with Clamp.*

meat or other material is forced through the cylinder by the feed shaft F against the knives K and N, shown in Fig. 3. The cutting edges of the knife K bear directly against the face

of the perforated plate, while knife N bears against the feed shaft. The pressure is regulated by the nut A, Fig. 5, which works against the washer

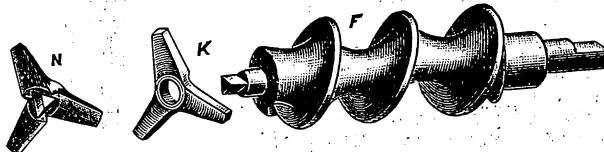
shown in Fig. 1, is made in three sizes, with capacities, it is claimed, of 1, 2 and 3 pounds of meat per minute. The cutters with feet, made in two sizes,



*Fig. 2.—Meat Cutter with Feet.*

W. The interior of the cylinder has seven beveled horizontal parallel projections or ribs  $\frac{1}{8}$  inch wide, against

cut 2 and 3 pounds per minute. The point is made that the meat is cut cleanly and never torn, that the parts



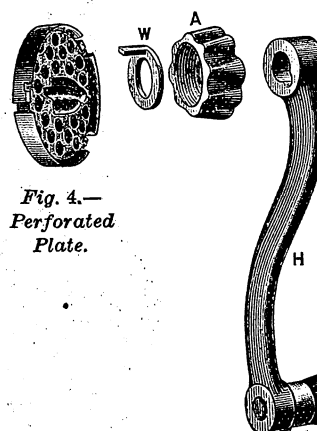
*Fig. 3.—Knives and Feed Shaft.*

which the feed shaft turns. The perforated plate, Fig. 4, is held in place by three wrought iron pins, which permit of the plate being removed instantly by turning slightly to the left. The handle is slipped on to the shaft and a quarter turn holds it in place,

are few and simple, and that they may be easily removed or replaced.

### Micrometer Caliper.

Brown & Sharpe Mfg. Company, Providence, R. I., are manufacturing a micrometer caliper, graduated to show the weight of sheet or plate iron or steel



*Fig. 4.—Perforated Plate.*

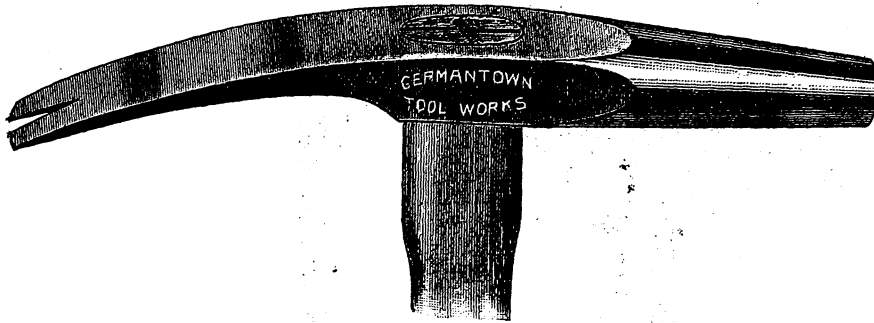
*Fig. 5.—Handle, Nut and Washer.*

in ounces per square foot. It measures all thicknesses less than 0.000000, or approximately  $\frac{1}{32}$  inch, each of the divisions on the thimble indicating an ounce and each division on the barrel 20 ounces. By the table of equivalents stamped on the frame of the caliper, the gauge number of the sheet or plate, it is stated, can be quickly determined when its weight per square foot has been ascertained.



**Germantown Tack Hammer.**

Germantown Tool Works, 518 Commerce street, Philadelphia, Pa., are putting on the market a new tack hammer, as shown in the accompanying cut. It is forged from bar steel, in upholsterers' pattern, and packed one-half dozen in patent boxes. The manufact-

*Germantown Tack Hammer.*

urers remark that there are many cheap tack hammers, but that a really good article is hard to find, as most of those in use are small, made from cast iron, breaking easily, and refer to this as a good hammer furnished for a moderate price. The cut is reduced one-third the actual size of the hammer.

**The Perfect Nipple Grip.**

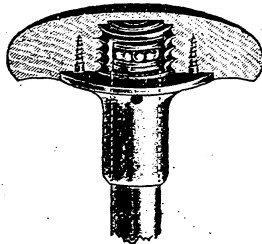
The accompanying cut represents a nipple grip manufactured by C. W. Cray & Sons Company, 87 Huron street, Chicago, for the Dudley & Meunier Mfg. Company, 272 West Water street, Milwaukee, Wis. The grip, which is shown as attached to a bicycle spoke for operation, is made of drop forged steel, blued or nickel plated. A coil spring between the jaws opens them to admit any size of nipple, either flat or square shoulder, and it is stated that a slight turn of the thumb screw tightly secures the grip even on nipples worn on the cor-

ening spokes. The tool is designed for the use of wheelmen and bicycle repairers.

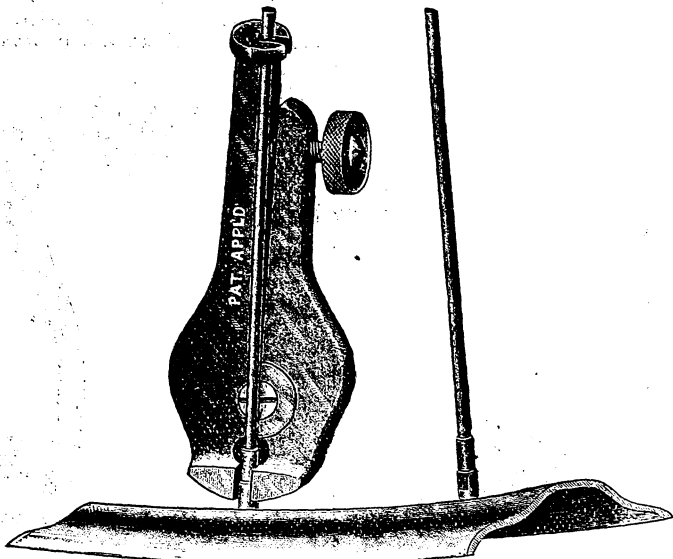
**Ball Bearing Device for Bit Braces.**

John S. Fray & Co., Bridgeport, Conn., are furnishing braces with ball

bearings as shown herewith. Two hardened steel washers are placed, one at the inner end of the iron thimble and the other at the shoulder of the

*Ball Bearing Device for Bit Braces.*

brace crank, which is milled up the required distance to receive them and the balls. Between the hardened washers the balls revolve, the whole being placed within the thimble thus secured from dirt and dust. In operation the

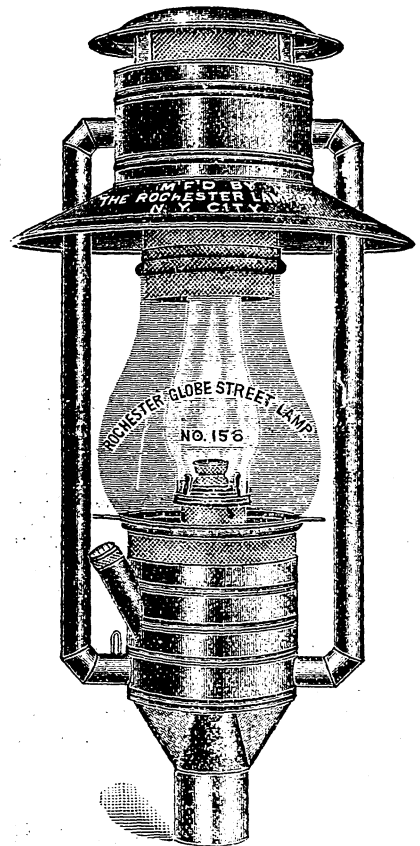
*The Perfect Nipple Grip.*

ners or covered with enamel, thus securing a better result than could be obtained with a stationary grip. The support hook on the small end of the tool maintains it in its correct position, thus aiding materially the rapid execution of the work of turning up a wheel or tight-

steel washer at the end of the brace crank turns with the crank, while the washer at the inner end of the thimble remains stationary with the head, thus providing two hardened steel surfaces as bearing faces, between which the balls revolve.

**Central Draft Street Lamps.**

The Rochester Lamp Company, 42 Park place, New York, have brought out a central draft street lamp, a general view of which is shown in the accompanying illustration. The advantages of the central draft lamp are being widely recognized, and its adaptation to street illumination will be of interest to the trade. Special reference is made to the great amount of light the lamp gives; and to the fact that it is unaffected by wind storms, as the air entering the lamp passes through wire gauze and then down through the side tubes, one of which supplies the central draft through a gauze chamber and the other tube supplying the outside of the flame through another gauze chamber. It is ex-

*Central Draft Street Lamps.*

plained that the air currents are so modified by this means that the lamp has been successfully used on ferry boats. The globe is held up by a hook while trimming or lighting. The regular No. 3 or 9 street lamp globe is used with it, and is so annealed and protected from heat by the use of a chimney on the lamp inside that it is proof against storm, rain, snow, sleet or hail. It is adapted to burn all night, or the time of burning can be regulated. It is made with either ball or post socket, and with 26-inch enamel reflector, if wanted for railroad or other uses. The lamp is also adapted to general purposes of railroad stations, hotels, stables, &c.

Coburn Trolley Track Mfg. Company, Holyoke, Mass., are adapting their overhead trolley track system to heavy doors where it is desired that they pass each other on parallel tracks into one pocket. They also show a device for sliding doors on electric car sheds, with an opening in the track for the trolley wire, so arranged that the doors readily pass the opening in the track.

**Simonds' Improved Saw Tool.**

Simonds Mfg. Company, Fitchburg, Mass., and 31 South Canal street, Chicago, are putting on the market an improved saw tool, as shown in the accompanying cuts. The tool, as shown in Fig. 1, is designed for fitting cross

made that the adjustable plate can be duplicated, and that there are no extra pieces to get mislaid or lost.

**Automatic Date and Time Stamp.**

The accompanying cut represents an electrical time and date stamp being

ically changing every minute and requiring setting only once a month. The machine consists of a series of endless rubber printing bands, so arranged as to move automatically, bringing the proper characters into position to print the exact time and date. It is remarked that rubber bands are not new, but that in this instance a number of them

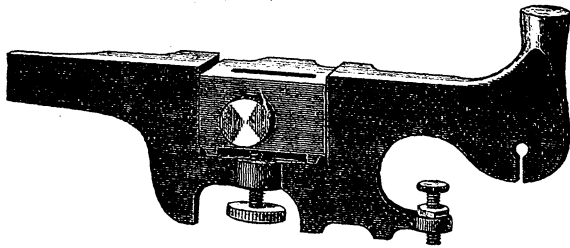


Fig. 1.—Simonds' Improved Saw Tool.

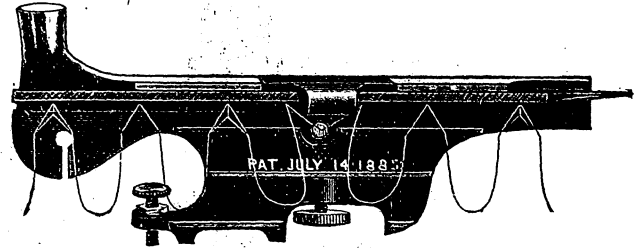


Fig. 2.—Tool with File.

cut saw teeth. Fig. 2 represents the tool with a file in its proper position for making the cutting teeth of uniform length. In Fig. 3 the adjustable plate is shown lowered to make the raker or cleaner teeth of uniform length, but shorter than the cutting teeth. Fig. 4 illustrates the tool in position for setting the teeth. In Fig. 5 is shown the

introduced by the Automatic Electrical Specialty Company, 136 Liberty street, New York. The mechanism of the stamp is contained in a case 2 x 3 x 3

are grouped upon one or more shafts, each turning independent of the other, so that the utmost exactness is obtained in getting an impression. The set of

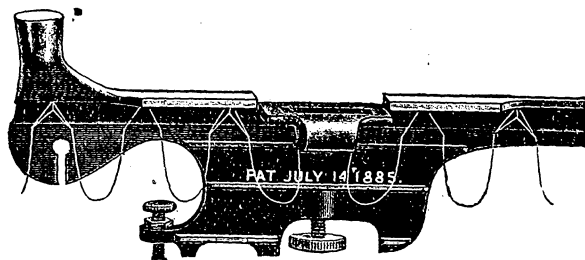


Fig. 3.—Tool with Adjustable Plate Lowered.

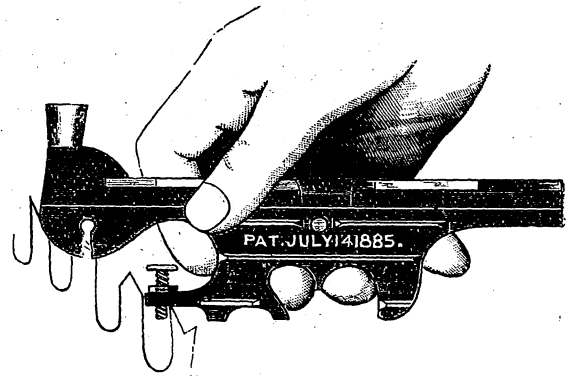


Fig. 4.—Setting Saw Teeth.

operation of the set gauge for securing uniformity of set. The manufacturers claim that the device combines in one tool a saw set, jointer, raker gauge, set gauge and swaging hammer in a convenient and compact form; that the saw tool can be adjusted without the use of

inches in size, hung between uprights, allowing it to be pressed alternately on the inking ribbon underneath and

bands are arranged in the case in such a manner that a small current, such as is generated by a Lelanche cell, passes

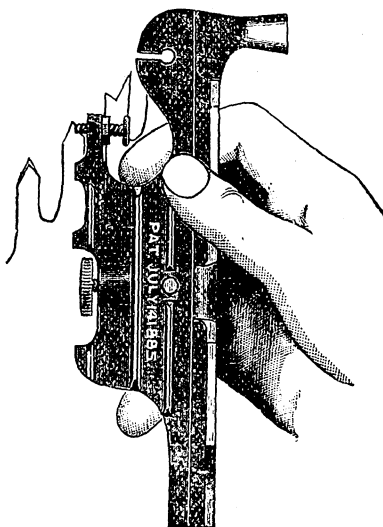
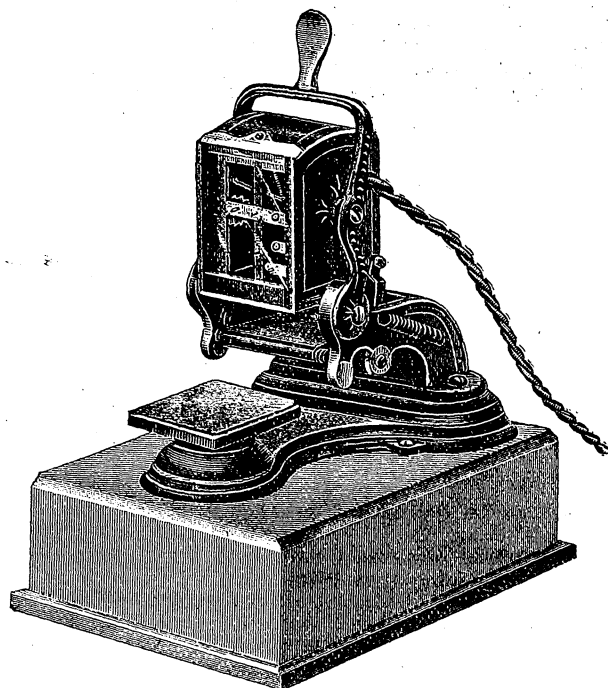


Fig. 5.—Set Gauge in Use.

other tools; that it weighs less than 10 ounces and can be easily carried in the pocket; that it is convenient to use, and that with the tool a saw can be fitted up quickly and accurately. The point is

then forward onto the plate. The device prints the exact time, together with the day, month and year, automat-

through an electro-magnet in the case and actuates an armature, which, in turn, by means of a lever, moves the

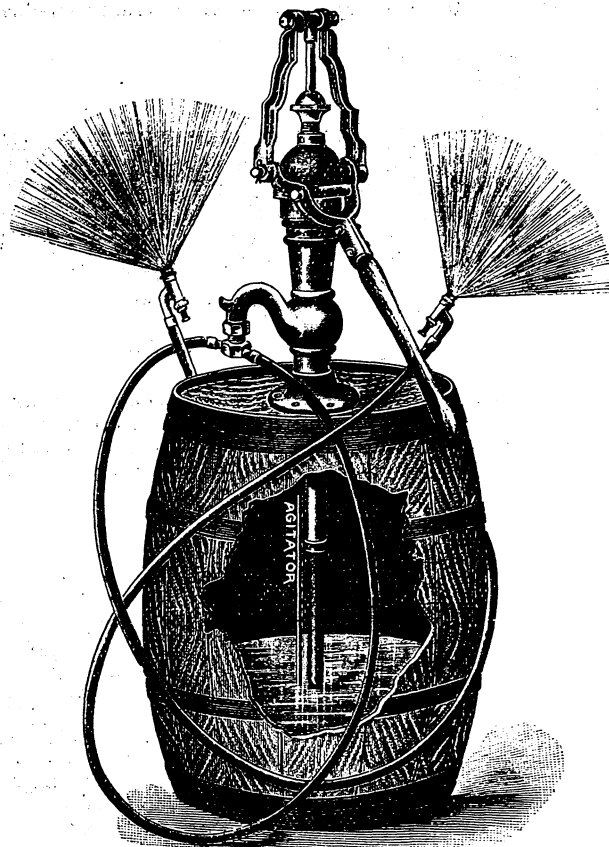


Automatic Date and Time Stamp.

first or minute band one notch, which changes the minutes. At the end of the ninth minute, the 10-minute band receives an impulse which changes that band, and a similar movement at the end of the 60 minutes changes the hours. At the proper time the a.m.

#### No. 16 Novelty Spray Pump.

Hess, Snyder & Co., Massillon, Ohio, are offering a spray pump as shown in the accompanying cut. In construction, a heavy brass cylinder is screwed into the plunger or bottom of the pump, to



No. 16 Novelty Spray Pump.

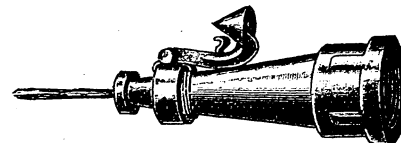
and p.m. bands are also changed. At midnight the day band is changed, and only once a month does the stamp need setting. Any die up to  $2 \times 2\frac{1}{2}$  inches in size may be used in connection with the stamp and can be instantly removed if desired. The ink is fed by an automatic device which renews at every impression. The stamp, it is stated, can be connected with any clock, and any

make the pump short and strong. The handle can be placed in any position around the pump, which feature is referred to as an advantage. It is stated that the handle attachment which connects the handle with the plunger rod allows water to be pumped in large quantities with ease, and that the pump has a  $6\frac{1}{2}$ -inch stroke. The agitator consists of a  $\frac{1}{4}$ -inch pipe which screws

their new factory at Thirty-first and Ludlow streets.

#### Spray Nozzle.

The accompanying illustrations show a spray nozzle offered by the Ette & Henger Mfg. Company, St. Louis, Mo. Fig. 1 represents the nozzle throwing a solid stream, while Fig. 2 shows it



Spray Nozzle.—Fig. 1.—View of Nozzle Throwing Solid Stream.

with the spray attachment. One of the special features to which the manufacturers direct attention is that it has no joints or packing to wear out or leak. The spray attachment, which it will be noticed is hinged, and may be thrown forward in front of the stream, will

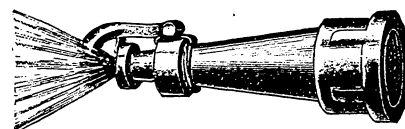
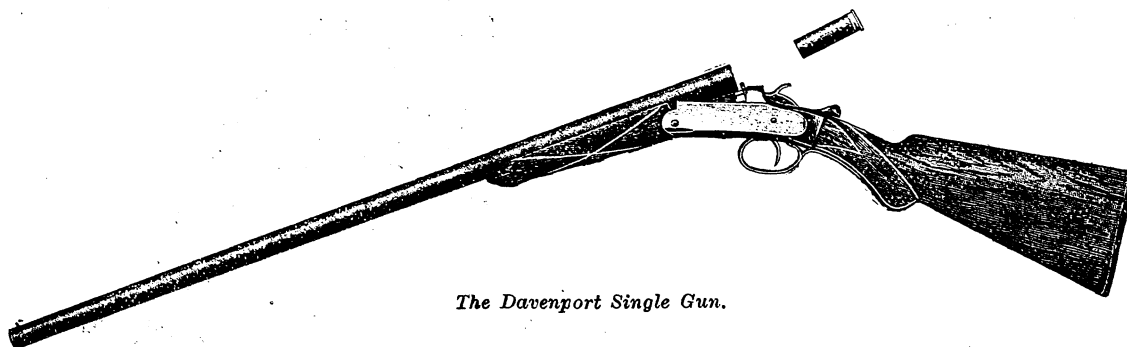


Fig. 2.—View of Nozzle Throwing Spray.

permit of a spray as fine as mist, or will close off the pressure entirely, acting as a cock. The nozzle is made in two sizes,  $\frac{3}{4}$  and 1 inch, both brass and nickel plated.

#### The Davenport Single Gun.

The accompanying illustration represents a new model top snap single gun put on the market by the W. H. Davenport Fire Arms Company, Norwich, Conn. The gun is described as having a detachable barrel, with a heavy lug securely bolted, and an extra strong screw key fastening with a stop. This screw key fastening, whereby the frame and barrel are easily detachable, is retained, it is stated, in this gun, as in all the goods manufactured by the com-



The Davenport Single Gun.

number of stamps can be connected with one clock, thus being made to serve in factories or offices as a combined employees' time stamp, watchman's clock and general check system. The point is made that in railroad or telegraph systems all the stamps can be connected to one master clock, which will operate all at the same instant, and that the stamps can also be arranged so as to print the time in connection with the alarm, police and messenger registers. It is stated that as the entire impression is made from rubber the machine requires no pounding to operate.

into the base of the pump and extends to the bottom of the barrel to keep the solution thoroughly mixed at all times. The pump is fitted with an attachment for either single or double line of hose, to which spray or solid stream tips can be connected. The pump is designed to attach on a tank or barrel, as shown in the cut. The manufacturers claim that the pump can be taken apart in five minutes, and that nothing but the best material enters into its construction.

CURTIS-CHILD MFG. COMPANY, Philadelphia, will on June 1 remove to

pany; but in this case it serves, besides fastening the barrel and frame together, as a pivot or hinge on which the barrel swings when the gun is opened or closed; and being tapered, acts also as a compensating medium in case of wear at that point. The gun is furnished with either nickel plated or case hardened frame, top snap action, rebounding lock and automatic ejector. It is explained that the ejector is so constructed that when the barrel is tipped down so as to open the gun the extractor is released at the time when the bottom side of the bore is just above a

line with the breech of the frame, then throwing the empty shell from the chamber of the gun with considerable force. The gun is provided with drop forged steel parts, extra heavy fine 30-inch steel barrels, choke bored; checkered pistol grip stock, rubber butt plate and checkered fore end. The manufacturers state that the gun is of thoroughly high grade in finish and detail. The gun is now made in 12 and 16 gauge, weighing 6½ to 6¾ pounds, and will later be made in 20 gauge.

#### Novelty Spray Pump No. 15.

Hess, Snyder & Co., Massillon, Ohio, are offering the spray pump here shown. The pump is made of IX bright tin, having sufficient air chamber, it is stated, to keep up a continuous stream while pumping. The attachment to



Novelty Spray Pump No. 15.

the plunger is such that the plunger rod works through a guide, causing the plunger to work up and down in a straight line. It is remarked that the pump will throw a steady stream 40 to 50 feet with ease, and that it is adapted to sprinkling flowers, gardens, lawns, washing windows, walks, buggies, &c., and to spraying trees or shrubbery of any kind. It is designed for a cheap spray pump and is fitted with hose and spray nozzle.

#### The Denison Quick Acting Vise.

The cuts here shown represent a quick acting pattern and cabinet makers'

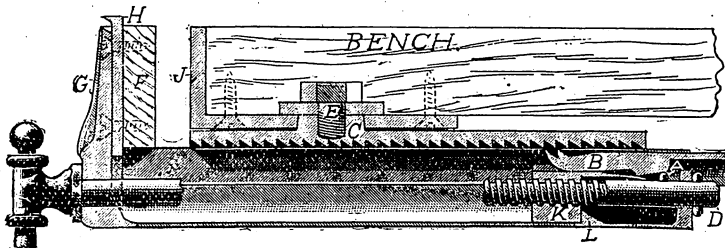


Fig. 1.—The Denison Quick Acting Vise.

vise put upon the market by J. R. Denison & Co., 43-45 South Front street, Grand Rapids, Mich. The vise is provided with iron and wood jaws and a steel dog which can be raised, it is explained, to suit convenience, if desired to clamp against the dog instead of the jaw when in use as a tail vise. The vise is hung on a pivot, so as to be

instantly changed from the position as a head vise to that of a tail vise without detaching, as shown in Fig. 2. It is pointed out that it is not only a quick acting vise adjustable solely by the use of the handle, but that after the quick adjustment is effected it can be drawn

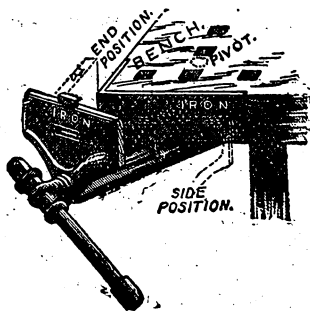
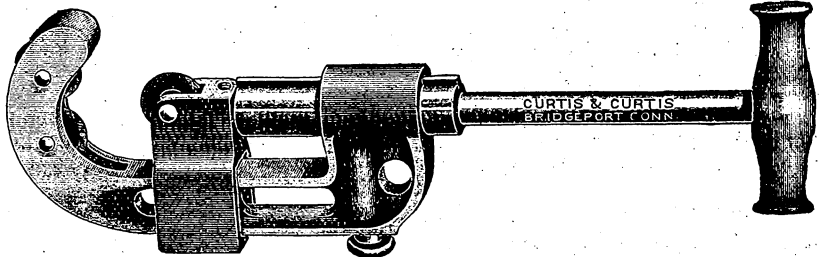


Fig. 2.—The Denison Vise in End or Side Positions.

on against the work with the continuous screw movement. This is a feature which, it is claimed, is peculiar to this vise. In addition to the mechanical advantages of the vise the manufacturers claim that by its use in factories but half the number of vises are required, but half the amount of bench room is needed, and that much time is saved by not being obliged to pass from one end of the bench to the other, as is necessary when using the ordinary style of vise. The vise is sent on trial by the manufacturers to any responsible parties, to be returned at the makers' expense if not satisfactory.

#### Curtis Pipe Cutter.

Curtis & Curtis, Bridgeport, Conn., have placed on the market a pipe



Curtis Pipe Cutter.

cutter, a general view of which is shown in the accompanying illustration. A special feature of this tool is its simplicity, and several merits are claimed for this device by the manufacturers. The general principle is the same as in other three-wheel cutters, except that in this

by simply sliding the sleeve along until the wheel is against the pipe, when a few turns of the screw, while the cutter is revolved, cuts it off.

#### Barnes' Sash Chain Fixture.

The Barnes Mfg. Company, Phoenix, N. Y., are introducing a new pattern of Phoenix sash chain fixture, as here

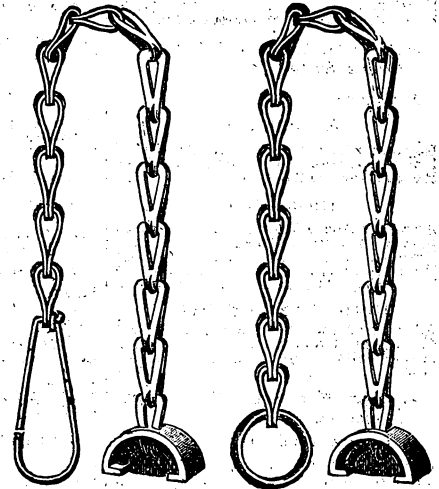


Fig. 1.—Barnes' Sash Chain Fixture.

Fig. 2.—Barnes' Chain Fixture for Patent Eye Weights.

shown. The curved steel pin passes through the loop of the chain and is confined in place by the flanges of the castings, making it impossible, it is stated,

for the pin to work out of place. Fig. 1 represents the fixture adapted to flat end weights, and Fig. 2 as adapted to weights with patent eye. The sash fixture is the same for both, but for use with flat end weights the steel wire hook or loop is furnished; while for patent eye weights, or those with a hole of such form as to preclude the use of the hook, a steel wire ring is furnished, designed to engage in the end of the chain and to draw up into the cored recess of the weight out of the way. A set of fixtures comprises enough for one two-sash window, and consists of four each sash plates and weight hooks or rings. These, it is remarked, are adapted to use on any make of sash chain. The manufacturers state that they have discontinued making the old pattern fixtures, as they consider these superior in every way, and that in future they will furnish only the kind here shown.

IN ONE OF THE SPECIAL NOTICES which appear in this issue Biddle Hardware Company, Philadelphia, offer for sale a retail Hardware store well located in Harrisburg, Pa. The stock is referred to as well assorted and clean and is valued at about \$8000.

# Current Hardware Prices.

MAY 23, 1894.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

The character @ is used to indicate a range of price thus discount 50&10@50&10&5 % signifies that the goods in question are sold at prices ranging from discount 50 and 10 % to discount 50 and 10 and 5 %.

## Adjusters, Blind—

Domestic..... 3 doz \$3.00, 33¢@33¢&10¢  
 Excelsior..... 3 doz \$10.00..... 50&10&5  
 North's..... 1 doz \$10.00..... 50&10&5  
 Zimmerman's—See Fasteners Blind.

## Ammunition—See Caps, Cartridges, Shells, &c.

## Anvils—

### American—

Eagle Anvils, 10 lb. 9¢..... 10¢@15¢  
 Horse shoe brand, Wrought..... 11¢@11¢  
 Moore & Barnes Mfg. Co..... 33¢

### Imported—

Armstrong Mouse Hole..... 9¢@10¢  
 S. & H. machine finished..... 10¢@11¢  
 Trenton..... 9¢@10¢  
 Wilkinson's..... 10¢@10¢  
 Peter Wright's..... 10¢@11¢

## Anvil Vise and Drill—

Allen Anvil and Vise \$3.00..... 40¢@10¢  
 Cheney Anvil and Vise..... 25¢  
 Millers Falls Co., \$18.00..... 25¢  
 Star..... 45¢@5¢

## Apple Parers—See Parers

## Apple, &c.

## Augers and Bits—

Boring Machine Augers..... 70¢@70¢&10¢  
 Car Bits, 12-in. twist..... 50¢  
 Common Augers and Bits..... 70¢@70¢&10¢  
 Cincinnati Bell-Hangers' Bits..... 30¢@10¢  
 Forster Pat. Auger Bits..... 15¢  
 Jennings' Pattern Car Bits..... 40¢  
 Jennings' Pattern Auger Bits..... 60¢  
 J. E. Jennings & Co., No. 10, extension lip..... 40¢  
 O. E. Jennings & Co., No. 30..... 60¢  
 O. E. Jennings & Co., Auger Bits, set 32¢ quarters, No. 5, 8, 10, 30, 50, 55¢  
 Russell Jennings' Augers and Bits 25¢@10¢  
 Lewis' Patent Single twist..... 45¢  
 L'Hommedieu Car Bits..... 15¢@10¢  
 Pugh's Black..... 20¢  
 Pugh's Jennings Pattern..... 30¢  
 Snell's Bits..... 60¢@50¢&10¢

## Bit Stock Drills—

Cleveland..... 50¢@10¢&5¢  
 Cincinnati, for wood..... 30¢@10¢  
 Cincinnati, for metal..... 45¢@10¢  
 Morse Twist Drills..... 50¢@10¢&5¢  
 New Process Twist Drill Co..... 50¢@10¢&5¢  
 Standard..... 50¢@10¢&5¢  
 Syracuse, for metal..... 50¢@10¢  
 Syracuse, for wood (wood list), 50¢@30¢&5¢

## Expansive Bits—

Clark's small, \$18; large, \$28..... 35¢@35¢&10¢  
 Ives' No. 4, 4 doz. \$60..... 40¢  
 Stearns, No. 1, 248; No. 2, \$18..... 35¢@40¢  
 Stearns' No. 2, \$28..... 20¢  
 Swan's..... 40¢

## Gimlet Bits—

Bee..... 25¢@25¢&10¢  
 Common..... 30¢@25¢&10¢  
 Diamond..... 40¢@12¢  
 Double Cut..... 40¢@10¢  
 Hartwell's..... 30¢@10¢, 40¢@10¢  
 Douglass..... 40¢@10¢&50¢  
 Ives..... 60¢@10¢&60¢&10¢  
 Shepardson's..... 45¢@10¢&45¢&10¢&5¢

## Hollow Augers—

Bonney's Adjustable, 3 doz. \$48..... 50¢  
 Cincinnati Adjustable..... 25¢@10¢  
 Cincinnati Standard..... 25¢@10¢  
 Douglass..... 33¢@33¢&10¢  
 French, Swift & Co. (Beecher)..... 33¢@33¢&10¢  
 Ives' Expansive..... 33¢@33¢&10¢  
 Ives' Expansive..... 33¢@33¢&10¢  
 Stearns..... 30¢@10¢  
 Universal Expansive, each \$4.50..... 20¢  
 Wood's, 3 doz., \$18..... 25¢@10¢

## Ship Augers and Bits—

L'Hommedieu's..... 15¢@10¢&15¢&10¢  
 Snell's..... 25¢@25¢&10¢  
 Snell's Ship Auger Pattern Car Bits..... 15¢@10¢&15¢&10¢  
 Watrous's..... 25¢@25¢&10¢

## Awl Hafts—See Hafts, Awl.

## Awls—

Brad, Handled..... 3 gr. \$2.50@3.00  
 Brad, Shouldered..... 3 gr. \$1.30@1.40  
 Peg, Pat..... 3 gr. 35¢@38¢  
 Peg, Should..... 3 gr. \$1.50@1.55  
 Scratch, Handled..... 3 gr. \$4.00@4.50  
 Scratch, Socket..... 3 doz. \$1.10@1.20

## Awl and Tool Sets—See Sets, Awl and Tool.

## Axes—

First quality, best brands..... \$6.00@8.50  
 First quality, other brands..... 5.50@6.00  
 Beveled add 50¢ doz.

## Axle Grease—See Grease, Axle.

## Axles—

No. 1 Common..... 3¢@3¢  
 No. 2 Common..... 4¢@4¢  
 Nos. 7 to 13..... 70¢  
 Nos. 15 to 22..... 47¢  
 Nos. 10 to 22..... 70¢  
 Concord Axles, loose collar..... 3¢ cash  
 Concord Axles, solid collar..... 4¢@1¢  
 Tubular Axles..... 50¢

## Bag Holders—See Holders, Bag.

## Balances—

Sash—  
 Caldwell, low list..... 30¢  
 Pullman..... 60¢

## Spring—

Spring Balances..... 40¢@40¢&10¢  
 No. 2000 20 50  
 Chatillon, 3 doz..... \$0.50 0.95 1.75 net  
 Chatillon Straight Balances..... 40¢@10¢  
 Chatillon Circular Balances..... 60¢@10¢

## Barb Wire—See Wire, Barb.

## Bars—

Crow—  
 Cast Steel..... 2 23¢@3¢  
 Iron, Steel Points..... 2 24¢@24¢

## Basins, Wash—

Standard Fiberglass, No. 1, 10 1/2 in., \$1.80;  
 12-inch, \$2.00; 18 1/2 in., \$2.50; 15-inch, \$3.00.

## Beams, Scale—

Scale Beams, List Jan. 12, '82..... 60¢@10¢  
 Chatillon's No. 1..... 40¢  
 Chatillon's No. 2..... 50¢@10¢&50¢&10¢  
 Custer's..... 33¢

## Beaters—

Egg—  
 Bryant's..... 3 gross \$14.00  
 Double (H. & R. Mfg. Co.), No. 0 \$12.00; No. 1, \$15.00; No. 2..... \$38.00  
 Dover..... 3 doz \$1.00@1.20  
 Gover (Standard Co.)..... 3 doz \$1.00  
 Duplex (Standard Co.)..... 3 doz \$1.00  
 Duplex Extra Heavy (Standard Co.)..... 3 doz \$1.00  
 Easy (H. & R. Mfg. Co.)..... 3 gro \$12.00  
 Improved Acme (H. & R. Mfg. Co.)..... 3 gro \$9.00  
 Silver & Co..... 3 gro \$5.50  
 Spiral..... 3 gro \$4.25 @ \$4.50  
 Triple (H. & R. Mfg. Co.)..... 3 gro \$16.50

## Culinary—

Keystone, P. D. & Co., Each, No. 1, \$1;  
 No. 2, \$2..... 20¢

## Bells—

Cow—  
 Common Wrought..... 60¢@10¢  
 Kentucky Durham..... 70¢@10¢  
 Kentucky, Sargent's list..... 70¢@10¢  
 Kentucky, "Star"..... 20¢@10¢  
 Texas Star..... 50¢@10¢&50¢&10¢  
 Western, Sargent's list..... 70¢@10¢

## Door—

Crank, Brooks'..... 50¢@10¢&5¢  
 Crank, Cone's..... 10¢  
 Crank, Cone's..... 20¢@10¢  
 Gong, Abbe's..... 35¢@10¢  
 Gong, Barton's..... 40¢@10¢  
 Gong, Yankes..... 45¢@10¢  
 Lever, H. & R. Mfg. Co.'s..... 50¢@10¢&5¢  
 Lever, Sargent's..... 60¢@10¢  
 Lever, Taylor's Bronzed or Plated..... net  
 Lever, Taylor's Japanned..... 25¢@10¢  
 Pull, Brooks'..... 50¢@10¢&5¢

## Electric—

Bigelow & Dowse..... 20¢@20¢&10¢  
 Wollensak's..... 20¢@20¢&10¢

## Hand—

Extra Heavy Brass..... 70¢  
 Light Brass..... 70¢@10¢&70¢&10¢  
 Silver Chime..... 33¢@10¢  
 White..... 33¢@10¢  
 Globe Cone's Patent..... 25¢@10¢&35¢

## Miscellaneous—

Call..... 45¢@50¢  
 Farm Bells..... 2 24¢  
 Steel Alloy Church and School Bells..... 50¢

## Bellows—

Blacksmiths'..... 60¢@10¢&10¢&70¢  
 Hand Bellows..... 40¢@10¢&50¢  
 Molders'..... 40¢@10¢&50¢

## Belt, Rubber—

Common Standard..... 75¢@10¢&75¢&10¢  
 Extra..... 60¢@10¢&5¢&70¢  
 Standard..... 70¢@10¢&75¢  
 N.Y.B. & P. Co., Carbon..... 60¢@10¢  
 N.Y.B. & P. Co., Double Diamond..... 60¢  
 N.Y.B. & P. Co., 1846 Para..... 40¢@10¢

## Bench Stops—See Stops, Bench

## Benders and Upsetters, Tire—

Detroit Perfected Tire Bender 15@15¢@10¢  
 Green River Tire Benders and Upsetters..... 20¢  
 Stoddard's Lightning Tire Upsetters..... 15¢

## Bits—

Auger, Gimlet, Bit Stock Drills, &c., see Augers and Bits.

## Bit Holders—See Holders.

## Blind Adjusters—See Adjusters, Blind.

## Blind Fasteners—See Fasteners, Blind.

## Blind Staples—See Staples, Blind.

## Blocks—

Cleveland Block Co., Mal. Iron..... 50¢@10¢  
 Moore's Novelty, Mal. Iron..... 50¢@10¢  
 See also Machines, Hot Iron.

## Boils—

## Carriage, Machine, &c.—

Com. list June 10, '84..... 80¢@10¢&80¢&10¢  
 Genuine Eagle, Norway, list Oct. '84..... 80¢@10¢&80¢  
 Eagle, Norway, list Oct. '84..... 80¢@10¢&80¢  
 Phila. pattern, list Oct. 7, '84..... 80¢  
 Bolt Ends, list Jan. 1, 1890..... 80¢@10¢&80¢  
 Machine, list Jan. 1, 1890..... 80¢@10¢&80¢

## Door and Shutter—

Cast Iron Barrel Square, &c..... 75¢@10¢&75¢&10¢  
 Cast Iron Chain (Sargent's list)..... 65¢@10¢&65¢  
 Cast Iron Shutter Bolts..... 75¢@10¢&75¢  
 Ives' Patent Door Bolts..... 60¢@10¢&60¢  
 Wrought Barrel..... 75¢@10¢&75¢  
 Wrt B. K. Flush Common..... 60¢@10¢&60¢  
 Wrt Shutter, Brass Knob..... 60¢@10¢&60¢  
 Wrt Shutter, Sargent's list..... 60¢@10¢  
 Wrt Shutter, all Iron, Stanley's..... 60¢@70¢  
 Wrought Square..... 75¢@10¢&75¢  
 Wrt Sunk Flush, Sargent's list..... 60¢@10¢  
 Wrt Sunk Flush, Stanley's list..... 60¢@10¢

## Stove and Plow—

Plow..... 60¢@10¢&60¢&10¢  
 Stove..... 65¢@70¢  
 R. B. & W., Plow..... 55¢

## Tire—

Common, list Feb. 28, '83..... 70¢@70¢&10¢  
 American Screw Company..... 75¢  
 Norway, Phila., list Oct. 16, '84..... 80¢  
 Bay State, list Feb. 28, '83..... 70¢  
 Port Chester Bolt and Nut Company..... 70¢  
 Empire list Feb. 28, '83..... 70¢  
 Keystone, Philadel., list Oct. '84..... 80¢  
 Norway, Phila., list Oct. '84..... 75¢  
 R. B. & W., Philadel., list Oct. 16, '84..... 80¢

## Borers, Tap—

Common and Ring..... 20¢@10¢  
 Clark's..... 33¢@35¢  
 Enterprise Mfg. Co..... 25¢  
 Ives' Tap Borers..... 33¢@35¢

## Boring Machines—See Machines, Boring.

## Bow Pins—See Pins, Bow.

## Boxes, Letter—

Tatum's..... 40¢

## Boxes, Wagon—

Per doz..... 24¢

## Boxes, Miter.

Spiker's Excelsior, 3 in. \$7.50, 4 in. \$8.50, 5 in. \$13.00, 6 in. \$15.00..... 20¢

## Braces—

American Bit Brace and Tool Co..... 50¢@10¢  
 Nos. 11, 21, 24, 27..... 70¢@10¢  
 Nos. 22, 23, 25..... 60¢@10¢&5¢  
 Nos. 13, 26, 36, 37..... 70¢@10¢  
 Amidon's..... 75¢@10¢&70¢  
 Barker's Imp'd Plain..... 55¢@10¢&5¢  
 Barker's Imp. Nickle..... 75¢@10¢&70¢  
 Barker's Imp. Nickel..... 75¢@10¢&70¢  
 Eclipse Ratchet..... 60¢  
 Globe Jawed..... 40¢@40¢&10¢  
 Corner Brace..... 40¢@40¢&10¢  
 Universal, 8 in., \$2.10; 10 in. \$2.25  
 Buffalo Ball..... \$1.10@1.15  
 Barber's..... 50¢@10¢  
 Barker's..... 50¢@5¢  
 Armstrong's..... \$1.00@1.10  
 Davis Patent..... 50¢@10¢  
 Fray's Genuine Spotted's..... 50¢@10¢  
 Fray's Nos. 70 to 120, 81 to 123, 207 to 414..... 50¢@10¢  
 Ives' New Haven Novelty..... 60¢@5¢&60¢  
 New Haven Ratchet..... 60¢@5¢&60¢  
 Barber Ratchet..... 60¢@5¢&60¢  
 Barber's..... 60¢@5¢  
 Spotted..... 60¢@5¢&60¢  
 P. S. & W. Co., Peck's Patent..... 80¢  
 Rose & Johnson..... 50¢  
 Barker's Imp. Polished..... 75¢@10¢&80¢  
 Barker's Imp. Nickel..... 65¢@10¢&70¢  
 Ratchet, Polished..... 50¢@10¢&60¢  
 Ratchet, Nickel..... 40¢@10¢&50¢  
 Buffalo Ball..... net, \$1.10@1.15

## Brackets—

Shelf, fancy..... 70¢@70¢&10¢  
 Sargent's list..... 65¢@70¢  
 Regular, list..... 60¢@10¢&70¢  
 Bradley Shelf Brackets..... 70¢@10¢

## Bright Wire Goods—See Wire.

## Brollers—

Hemis Self, 1 inch..... 9 10 9x11  
 Basting, 1 Per doz..... \$4.50 5.50 6.50  
 Morgan Odorous..... 3 doz. \$12, 50¢  
 New Haven..... 50¢  
 Queen City..... 33¢  
 Wire Goods Co..... 55¢@10¢

## Buckets, Well and Fire—

See Pails, Galvanized.

## Bull Rings—See Rings, Bull.

## Butcher's Cleavers—See Cleavers, Butcher's.

## Butts—

Brass—  
 Cast Brass, Fast..... 33¢@10¢  
 Cast Brass, Loose Joint..... 33¢@10¢  
 Cast Brass, Tiebout's..... 50¢  
 Wrought Brass..... 80¢@10¢&80¢  
 Cast Iron—  
 Fast Joint, Broad..... 60¢@10¢  
 Fast Joint, Narrow..... 60¢@10¢

Loose Joint, Japanned.....  
 Loose Joint, Jap. with Acorns..... 75¢@10¢  
 Loose Pin, Acorns..... @80¢  
 Loose Pin, Acorns, Japanned.....  
 Loose Pin, Acorns, Japanned, Plated Tips.....  
 Mayer's Hinges.....  
 Parliament Butts.....

## Wrought Steel—

Fast Joint, Broad.....  
 Fast Joint, Narrow.....  
 Fast Joint, Lt. Narrow.....  
 Inside Blind, Light.....  
 Inside Blind, Regular.....  
 Loose Joint, Broad.....  
 Loose Pin.....  
 Table Butts, Back Flaps, &c.....  
 Bronzed Wrought Butts..... 50¢@10¢&50¢

## Cages, Bird—

Handy Brass.....  
 3000, 5000, 1100 series..... 10¢  
 1200 series..... 40¢  
 200, 300, 600 and 800 series..... 40¢@10¢&60¢  
 Hendryx Bronze.....  
 700, 800 series..... 40¢@10¢&60¢  
 Hendryx Enamelled..... 40¢@10¢&60¢

## Calipers—See Compasses.

## Calks, Toe—

Burke's, One Prong, Blunt..... 4¢@5¢  
 Burke's, One Prong, Sharp..... 5¢@6¢  
 Burke's, Two Prong, Blunt..... 5¢@6¢  
 Burke's Two Prong, Sharp..... 5¢@7¢  
 Gaudier, One Prong, Blunt..... 5¢@6¢

## Can Openers—See Openers, Can.

## Cans Milk—

S. S. & Co., 5-gal., \$3.00; 8-gal., \$4.40;  
 10-gal., \$4.75 each..... 40¢@10¢

## Cans Oil—

Galvanized Blue Band, 1 gal., 3 doz. \$2.35  
 Galvanized Blue Band, 5 gal., Tip-Top..... 3 doz. \$12.00  
 Galvanized Blue Band, 5 gal., Faucet..... 3 doz. \$8.00

## Glass Oil, Friend..... 3 doz. \$2.75

## Caps—Percussion—

Hicks & Goldmark's and Union Metallic Cartridge Co..... 1000  
 Eley's E. B..... 56¢@58¢  
 Eley's D Waterproof, Central Fire..... \$1.00  
 E. B. & D. Edge, Cent. Fire, 1-10's..... 47¢@50¢  
 E. B. Trimmed Edge, 1-10's..... 47¢@50¢  
 F. L. Waterproof, 1-10's..... 35¢@37¢  
 G. D..... 27¢@30¢  
 Musket, Waterproof, 1-10's..... 50¢@53¢  
 S. B. Genuine Imported..... 45¢

## Primers—

Berdan Primers, \$1.00..... 25¢  
 E. L. Caps (Sturtevant's) \$1.00..... 25¢  
 All Primers, \$1.20..... 25¢

## Cards

Watson's Cotton, Wool, Horse and File, list January 28, 1891..... 25¢

## Carpet Stretchers—

See Stretchers, Carpet.

## Cartridges—

B. B. Caps, Cent. Ball, Swgd., \$1.35@1.90  
 B. B. Caps, Round Ball..... \$1.60@1.65  
 Blank Cartridges, except 22 and 32 cal., additional 10¢ to above discounts.  
 Blank Cartridges, 22 cal. \$1.75..... 25¢  
 Blank Cartridges, 32 cal. \$1.50..... 25¢  
 Cent. Fire, Military and Sporting 15¢@25¢  
 Cent. Fire, Pistol and Rifle..... 25¢@35¢  
 Primed Shells and Bullets..... 15¢@25¢  
 Rim Fire Cartridges..... 60¢@50¢  
 Rim Fire Military..... 15¢@25¢

## Carpet Sweepers—

See Sweepers, Carpet.

## Casters—

Bed..... 55¢@55¢&10¢  
 Shallow Socket..... 60¢@60¢&10¢  
 Deep Socket..... 40¢@10¢  
 Giant Truck Casters..... 35¢  
 Gwinner's Common Sense..... 45¢@50¢  
 G



**Chalk Lines—See Lines.**  
**Checks, Door—**  
 Barclay's, 20%  
 Unity, 50%  
**Chisels—**  
**Socket Framing and Firmer**  
 Ohio Tool Co., 75%  
 P. S. & W., 80%  
 Witherby, 30%  
 Buck Bros., 30%  
 Charles Buck, 30%  
 Douglass, 75%  
 Merrill, 60%  
 L. & J. White, 30%  
**Tanged and Miscellaneous—**  
 Buck Bros., 30%  
 Charles Buck, 30%  
 Butchers, 4.75%  
 Spear & Jacksons, 25%  
 Tanged Filmers, 50%  
 L. & J. White, Tanged, 25%  
 Cold Chisels, fair quality, 14%  
**Chucks—**  
 Beach Pat., each, \$8.00, 20%  
 Danbury, each, \$8.00, 30%  
 Graham Patent, 35%  
 Morse's Adjustable, each, \$7.00, 20%  
 Syracuse, 25%  
 Skinner Patent Chucks, 25%  
 Combination Lathe Chucks, 40%  
 Drill Chucks, 25%  
 Independent Lathe Chucks, 40%  
 Planer Chucks, 20%  
 Universal Lathe Chucks, 40%  
 Union Mfg. Co., 40%  
 Combination, 40%  
 Independent, 40%  
 Universal, 40%  
 Victor, 35%  
**Churns—**  
 McDermaid Star Barrel Churn, each 6 gal., \$2.60; 10 gal., \$2.75; 15 gal., \$3.00; 20 gal., \$3.25  
 Tiffin Union, each, 5 gal. \$3.25; 7 gal., \$3.75; 10 gal., \$4.25  
**Clamps—**  
 Adjustable, Cincinnati, 15%  
 Adjustable, Hammers, 15%  
 Adjustable, Stearns', 30%  
 Barnes' Machinists' Clamps, 33%  
 Cabinet, Sargent's, 70%  
 Carpenter's, Cincinnati, 25%  
 Carriage Makers', P. S. & W. Co., 40%  
 Carriage Makers', Sargent's, 75%  
 Eberhard Mfg. Co., 40%  
 Joiners' Clamps, Tatum's, 25%  
 R. I. Tool Co.'s Wrought Iron, 25%  
 Saw Clamps, see Vises, Saw Filers  
 Stearns's Malleable, with Wrought Iron Screw, 40%  
 Warner's, 40%  
**Cleavers, Butchers—**  
 Beatty's, 40%  
 Bradley's, 25%  
 Foster Bros., 30%  
 New Haven Edge Tool Co.'s, 40%  
 Nichols Bros., 30%  
 P. S. & W. Co., 40%  
 Schulte, Lohoff & Co., 40%  
 L. & J. White, 25%  
**Clips—**  
 Baker Axle Clips, 25%  
 Norway, Axle, 65%  
 Norway Spring Bar Clips, 65%  
 2d grade Norway Axle, 70%  
 Steel Felloe Clips, 70%  
 Superior Axle Clip, 70%  
 Wrought Iron Felloe Clips, 70%  
**Cloth and Netting, Wire—**  
 See Wire, &c.  
**Cockeyes—**  
 Hardware list (Globe, Kerosene, Lever Bibbs, Racking, &c.), 60%  
**Coffee Mills—See Mills, Coffee.**  
**Collars Dog—**  
 Brass, Pope & Stevens's list, 40%  
 Chapman's Company, new list, 40%  
 Embossed Gift, Pope & Stevens's list, 40%  
 Leather, Pope & Stevens's list, 40%  
 Medford Fancy Goods Co., 40%  
**Combs Curry—**  
 American Curry Comb Co., 33%  
 Fitch's, 50%  
 Gibbs' Magnetic, 20%  
 Kohler's Hummer, 15%  
 Kohler's Magic Collimating, 20%  
 Rubber, per doz., \$10.00, 25%  
**Compasses, Dividers &c.**  
 Compasses, Callipers, Dividers, 70%  
 Bemis & Call Co.'s  
 Dividers, 85%  
 Callipers, Call's Patent Inside, 55%  
 Callipers, Double, 80%  
 Callipers, Inside or Outside, 80%  
 Callipers, Wing, 80%  
 Compasses, 50%  
 Excelsior, 50%  
 Starrett's  
 Combination Dividers, 25%  
 Lock Callipers and Dividers, 25%  
 Spring Callipers and Dividers, 25%  
 Stevens & Co.'s, 25%  
**Coolers, Water—**  
 S. S. & Co., 2 gal., \$3.40; 3 gal., \$4.00; 4 gal., \$4.50; 5 gal., \$5.00 each, 60%  
**Coopers' Tools—**  
 See Tools, Coopers'.  
**Cord—Sash—**  
 Braided, Crown Drab and Fancy, 50%  
 B. 55%, 50%  
 Braided, Crown White, 50%  
 Cable Laid Italian Sash, 10%  
 Common, 8%  
 Common Russia Sash, 12%  
 Egyptian, India Hemp, Braided, 15%  
 India Cable Laid Sash, 11%  
 Massachusetts, White, 22%  
 Ossawaun Mills—  
 Braided, Giant, Drab and Fancy, 10%  
 B. 55%, 10%  
 Braided, Giant, White, 30%  
 Patent, good quality, 10%  
 Patent Russia Sash, 13%  
 Ramon—  
 Braided, Drab Cotton, 42%  
 Braided, India Hemp, 42%  
 Braided, Linen, 42%  
 Braided, White Cotton, 37%  
 Semper Idem, Braided, White, 20%  
 Silver Lake—  
 A quality, Drab, 55%  
 A quality, White, 50%  
 B quality, Drab, 35%  
 B quality, White, 30%  
 Sylvan Spring, Extra Braided, Drab, 39%  
 Sylvan Spring, Extra Braided, White, 34%  
 Tate's Solid Braided—  
 Economy, Drab, 27%  
 Economy, White, 22%

Hercules, Drab, 30%  
 Hercules, White, 25%  
 White Cotton Braided, fair, 28%  
**Wire Picture—**  
 Braided or Twisted, 80%  
**Corkscrews—See Screws, Cork.**  
**Corn Knives and Cutters—**  
 See Knives, Corn.  
**Crackers, Nut—**  
 Acme, 30%  
 Japanned, 30%  
 Nickel Plated, 30%  
 Table (H. & B. Mfg. Co.), 30%  
 Turner & Seymour Mfg. Co., 50%  
**Cradles—**  
 Grain, 50%  
**Crayons—**  
 White Crayons, 30%  
 Cases, 100 gr., \$3.75; at factory, 25%  
 D. M. Steward Mfg. Co., 25%  
 Metal Workers', 25%  
 Railroad, 25%  
 Rolling Mill, 25%  
 Soapstone Pencils, 25%  
 See also Chalk.  
**Creamery Pails—See Pails, Creamery.**  
**Crow Bars—See Bars, Crow.**  
**Curry Combs—**  
 See Combs, Curry.  
**Cutters—Meat—**  
 American, 30%  
 Nos. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 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622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 1348, 1349, 1350, 1351, 1352, 1353, 1354, 1355, 1356, 1357, 1358, 1359, 1360, 1361, 1362, 1363, 1364, 1365, 1366, 1367, 1368, 1369, 1370, 1371, 1372, 1373, 1374, 1375, 1376, 1377, 1378, 1379, 1380, 1381, 1382, 1383, 1384, 1385, 1386, 1387, 1388, 1389, 1390, 1391, 1392, 1393, 1394, 1395, 1396, 1397, 1398, 1399, 1400, 1401, 1402, 1403, 1404, 1405, 1406, 1407, 1408, 1409, 1410, 1411, 1412, 1413, 1414, 1415, 1416, 1417, 1418, 1419, 1420, 1421, 1422, 1423, 1424, 1425, 1426, 1427, 1428, 1429, 1430, 1431, 1432, 1433, 1434, 1435, 1436, 1437, 1438, 1439, 1440, 1441, 1442, 1443, 1444, 1445, 1446, 1447, 1448, 1449, 1450, 1451, 1452, 1453, 1454, 1455, 1456, 1457, 1458, 1459, 1460, 1461, 1462, 1463, 1464, 1465, 1466, 1467, 1468, 1469, 1470, 1471, 1472, 1473, 1474, 1475, 1476, 1477, 1478, 1479, 1480, 1481, 1482, 1483, 1484, 1485, 1486, 1487, 1488, 1489, 1490, 1491, 1492, 1493, 1494, 1495, 1496, 1497, 1498, 1499, 1500, 1501, 1502, 1503, 1504, 1505, 1506, 1507, 1508, 1509, 1510, 1511, 1512, 1513, 1514, 1515, 1516, 1517, 1518, 1519, 1520, 1521, 1522, 1523, 1524, 1525, 1526, 1527, 1528, 1529, 1530, 1531, 1532, 1533, 1534, 1535, 1536, 1537, 1538, 1539, 1540, 1541, 1542, 1543, 1544, 1545, 1546, 1547, 1548, 1549, 1550, 1551, 1552, 1553, 1554, 1555, 1556, 1557, 1558, 1559, 1560, 1561, 1562, 1563, 1564, 1565, 1566, 1567, 1568, 1569, 1570, 1571, 1572, 1573, 1574, 1575, 1576, 1577, 1578, 1579, 1580, 1581, 1582, 1583, 1584, 1585, 1586, 1587, 1588, 1589, 1590, 1591, 1592, 1593, 1594, 1595, 1596, 1597, 1598, 1599, 1600, 1601, 1602, 1603, 1604, 1605, 1606, 1607, 1608, 1609, 1610, 1611, 1612, 1613, 1614, 1615, 1616, 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1632, 1633, 1634, 1635, 1636, 1637, 1638, 1639, 1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647, 1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655, 1656, 1657, 1658, 1659, 1660, 1661, 1662, 1663, 1664, 1665, 1666, 1667, 1668, 1669, 1670, 1671, 1672, 1673, 1674, 1675, 1676, 1677, 1678, 1679, 1680, 1681, 1682, 1683, 1684, 1685, 1686, 1687, 1688, 1689, 1690, 1691, 1692, 1693, 1694, 1695, 1696, 1697, 1698, 1699, 1700, 1701, 1702, 1703, 1704, 1705, 1706, 1707, 1708, 1709, 1710, 1711, 1712, 1713, 1714, 1715, 1716, 1717, 1718, 1719, 1720, 1721, 1722, 1723, 1724, 1725, 1726, 1727, 1728, 1729, 1730, 1731, 1732, 1733, 1734, 1735, 1736, 1737, 1738, 1739, 1740, 1741, 1742, 1743, 1744, 1745, 1746, 1747, 1748, 1749, 1750, 1751, 1752, 1753, 1754, 1755, 1756, 1757, 1758, 1759, 1760, 1761, 1762, 1763, 1764, 1765, 1766, 1767, 1768, 1769, 1770, 1771, 1772, 1773, 1774, 1775, 1776, 1777, 1778, 1779

**Halters—**

Covert's Adj. Rope Halters..... 40¢25¢  
Covert's Adj. Web Halters..... 35¢52¢  
Covert's Hemp Horse and Cattle Tie..... 50¢10¢25¢  
Covert's Jute Cattle Ties..... 70¢10¢25¢  
Covert's Jute Horse Ties..... 70¢10¢25¢  
Covert's Rope, 7-in. Hemp..... 50¢10¢25¢  
Covert's Rope, 1-in. Hemp..... 50¢10¢25¢  
Covert's Saddle Works Halters..... 35¢10¢25¢  
Covert's Saddle Works Handy Web Halters..... 35¢10¢25¢  
Covert's Saddle Works Horse and Cattle Ties..... 35¢10¢25¢

**Hammers—****Handled Hammers—**

Atha Tool Co..... 50¢10¢60¢  
Buffalo Hammer Co..... 50¢10¢60¢  
Humason & Beckley..... 50¢10¢60¢  
Verree..... 50¢10¢60¢  
Cheney's Claw..... 40¢10¢60¢  
Cheney's Machinist's & Riveting..... 50¢10¢60¢  
C. Hammond & Son..... 50¢10¢60¢  
Magnetic Tack, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

**Handled Hammers—**

Artisan's Choice, A. E. Nail..... 40¢10¢  
Riveting, Engineers' and B. S. Hand..... 60¢  
Machinist's Hammers..... 60¢10¢  
Regular Y. & P. A. E. Nail..... 60¢  
Other Hammers..... 60¢10¢  
Sargent's..... 40¢10¢50¢  
Warner & Nobles, new list..... 25¢10¢

**Heavy Hammers and Sledges—**

3 lb and under..... 40¢10¢  
3 to 5 lb..... 80¢80¢10¢  
Over 5 lb..... 80¢10¢  
Wilkinson's Smiths..... 10¢10¢10¢

**Handcuffs and Leg Irons—**

See Police Goods.

**Handles—**

Cross-Cut Saw Handles—

Atkins, new list..... 40¢  
Champion..... 15¢  
Ely's Perfection..... 50¢  
Sensible per doz. Fr..... \$5.00, 50¢50¢10¢

**Iron, Wrought or Cast—**

Barn Door, per doz..... 20¢5¢  
Bronze Iron Drop Latches..... 70¢10¢75¢  
Chest and Lifting..... 70¢10¢75¢  
No..... 0 1 2 3 4  
Per doz..... \$0.90 1.00 1.08 1.35 1.50

**Wood**

Jap'd Store Door Handles—Nuts, 1.62¢  
Plate, 1.10¢; no plate, 80¢88¢  
Roggin's Latches..... per doz 25¢30¢

**Anger, assorted..... per gr 5.00**

Anger, large..... per gr 7.00..... 50¢  
File, assorted..... per gr 2.75

**Brad Axl..... per gr 2.00**

Apple Firmer Chisel, ass'd..... per gr 5.00  
Apple Firmer Chisel, large..... per gr 4.50  
Hickory Firmer Chisel, large..... per gr 5.00  
Hickory Firmer Chisel, ass'd..... per gr 3.00  
Socket Framing Chisel, ass'd..... per gr 5.00  
Chisel, Fibre Head..... 35¢10¢  
Hammer, Hatchet, Axe, &c..... 40¢40¢25¢  
Hoe, Rake, Shovel, &c..... 60¢40¢25¢  
Pat. Anger, Double..... 30¢10¢  
Pat. Anger, Ives..... 30¢10¢  
Pat. Anger, Swan's..... per set \$1.00  
Saw and Plane..... 40¢10¢50¢  
J. B. Smith & Co.'s Pat. File..... 50¢

**Hangers—**

Barn Door, New England..... 70¢70¢5¢  
Barn Door, old patterns..... 70¢70¢25¢  
Barry..... 60¢10¢60¢10¢  
Best Anti-Friction..... 60¢10¢60¢10¢  
Boss..... 60¢10¢60¢10¢  
Carrier Steel Anti-Friction..... 50¢10¢  
Champion..... 60¢10¢  
Chicago Anti-Friction..... 30¢10¢  
Climax Anti-Friction..... 55¢  
Cincinnati Nos. 1, 2, 25; 3, 25; 4, 25; 5, 25; 6, 25; 7, 25; 8, 25; 9, 25; 10, 25; 11, 25; 12, 25; 13, 25; 14, 25; 15, 25; 16, 25; 17, 25; 18, 25; 19, 25; 20, 25; 21, 25; 22, 25; 23, 25; 24, 25; 25, 25; 26, 25; 27, 25; 28, 25; 29, 25; 30, 25; 31, 25; 32, 25; 33, 25; 34, 25; 35, 25; 36, 25; 37, 25; 38, 25; 39, 25; 40, 25; 41, 25; 42, 25; 43, 25; 44, 25; 45, 25; 46, 25; 47, 25; 48, 25; 49, 25; 50, 25; 51, 25; 52, 25; 53, 25; 54, 25; 55, 25; 56, 25; 57, 25; 58, 25; 59, 25; 60, 25; 61, 25; 62, 25; 63, 25; 64, 25; 65, 25; 66, 25; 67, 25; 68, 25; 69, 25; 70, 25; 71, 25; 72, 25; 73, 25; 74, 25; 75, 25; 76, 25; 77, 25; 78, 25; 79, 25; 80, 25; 81, 25; 82, 25; 83, 25; 84, 25; 85, 25; 86, 25; 87, 25; 88, 25; 89, 25; 90, 25; 91, 25; 92, 25; 93, 25; 94, 25; 95, 25; 96, 25; 97, 25; 98, 25; 99, 25; 100, 25; 101, 25; 102, 25; 103, 25; 104, 25; 105, 25; 106, 25; 107, 25; 108, 25; 109, 25; 110, 25; 111, 25; 112, 25; 113, 25; 114, 25; 115, 25; 116, 25; 117, 25; 118, 25; 119, 25; 120, 25; 121, 25; 122, 25; 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Plate.....	45¢
Romer's Night Latches.....	15¢
E. & E. Mfg. Co., list Mar. 20, 1889.....	60¢10/70
Sargent & Co., list A.L. 1. 4P. 60¢10/70	
Warner's Burglar Proof.....	50¢
Yale.....	net prices

**Elevator—**

Moore's.....	38½¢
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**Padlocks—**

Wrought Iron Padlocks:	
Brittan, Graham & Mathes, list Jan., 1894.....	75¢
Mallory, Wheeler Co., list Jan. 1, 1894.....	75¢
Norwich Lock Mfg. Co., list June 10, 1891.....	60¢2½
Russell & Erwin Mfg. Co., list June 10, 1891.....	50¢2½
Sargent & Co., list January 1, 1894.....	75¢
William Wilcox Mfg. Co., list January 1, 1894.....	75¢
Ames Sword Co. up to No. 108 inclu. 50¢	
Ames Sword Co. above No. 103.....	50¢1½
Barnes Mfg. Co.....	40¢40/100
Champion Padlocks.....	40¢
A. E. Deitz.....	40¢
Eagle.....	40¢
Eureka, Eagle Lock Co.....	40¢2½
E. T. Frahm's Keystone Scandinavian.....	90¢5½
1010 line.....	90¢5½
120 line.....	90¢2½
109 line.....	65¢
510 line.....	70¢10
225, 610 and 209 lines.....	70¢
All other numbers.....	50¢2½
Horseshoe.....	50¢
Hotchises.....	30¢
Rock's.....	30¢
Romer's Nos. 0 to 91.....	30¢
Romer's Scandinavian, &c., Nos. 100 to 505.....	15¢
Scandinavian.....	90¢50
Slaymaker, Barry & Co.....	90¢
No. 1010 line.....	50¢
No. 41 line.....	50¢
No. 61 line.....	60¢
No. 21 line.....	70¢
No. 109 line.....	90¢40
Star.....	60¢
Yale Lock Mfg. Co.'s.....	net prices

**Sash, &c.—**

Attwell Mfg. Co.....	25¢33½¢
Champion Safety list January 1893.....	70¢3½
Clark's No. 1, 101, No. 2, 38 gr.....	33½¢
Common Sense, Jap'd, Cop'd and Br'd.....	gr \$4.00
Common Sense, Nickel Plated.....	gr \$10.00
Corbin's Daisy list Feb. 15, 1886.....	70¢
Fergus Bronze, Barnes Mfg. Co.....	39½¢
Ferguson's.....	39½¢
Fish (Liesche's pat.), No. 100, gr.....	50¢
No. 105, gr.....	50¢
Giant, list Jan., 1892.....	70¢3½
Hammond's Window Springs.....	40¢
Huganin's New Sash Locks.....	25¢5½
Huganin's Sash Balances.....	25¢5½
Ives' Patent.....	60¢10/25¢60¢10/10
Kempshall's Gravity.....	60¢
Kempshall's Model.....	60¢60/10
Monarch.....	60¢
Payson's Perfect.....	60¢10/10
Reading.....	60¢10/10
Security.....	70¢
Universal.....	60¢10/25
Victor.....	60¢10/25
Walker's.....	10¢
Wolcott's.....	60¢10/25

**Lumber Tools—**

See Tools, Lumber.

**Lustro—**

Four-ounce bottles.....	75¢, \$1.75; 75¢ gross.....
	\$17.00

**Machines.****Boring—**

Without Augers. Upright. Angular.	
Boss, Carpenters' 3.60	
Boss, Ship Blids' 3.35	
Douglas.....	\$5.50 \$6.75.....
Jennings'.....	5.50 6.75.....
Millers Falls.....	7.50.....
Phillip's Patent	
with Auger.....	7.00 7.50.....
Snell's, Rice's Pat 5.50 6.75.....	40¢10/10

**Fluting—**

American, 5 in., \$3.00; 6 in., \$3.40; 7 in., \$4.50 each.....	35¢
Combined Fluter and Sad Iron.....	do \$15.00.....
Crown, 4½ in., \$3.50; 6 in., \$4.00; 8 in., \$6.50 each.....	35¢
Crown Hand Fluter, Nos. 1, \$15.00; 2, \$12.50; 3, \$10.00; 4, \$8.25.....	35¢
Crown Jewel, 6 in., \$3.50 each.....	35¢
Domestic Fluter.....	each, \$1.50
Eagle, 8½-inch Rolls, \$2.15.....	35¢
Eagle, 5½-inch Rolls, \$2.85.....	35¢
Knox, 8½-inch Rolls.....	\$3.25 each
Knox, 6-inch Rolls.....	\$3.60 each

**Holting—**

Moore's Anti-Friction Differential Pulley Block.....	20¢
Moore's Hand Holst, with Lock Brake.....	20¢
Moore's Rope Differential Pulley Block.....	60¢
Maris & Beekley (Teal Patent).....	30¢
See also Blocks.	

**Washing—**

Fair and Square.....	75¢ doz \$42.00
Anthony Wayne.....	75¢ doz, No. 1, \$42; No. 2, 33¢; No. 3, \$42.
Wayne American.....	75¢ doz \$36.00
Wells.....	75¢ doz \$64.00
Western Star.....	75¢ doz, No. 2, \$36; No. 3, \$39

**Mallets—**

B. & L. Block Co., Hickory & L. V.....	30¢10/40
Vibre Head, Stearns.....	20¢10/20
Hickory.....	20¢10/20
Lignumvite.....	20¢10/20

**Mattocks—Regular list.**

Standard Fibreware, No. 1, peak.....	dozen, \$3.50; ½ peak, \$3
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**Measures—**

Standard Fibreware, No. 1, peak.....	dozen, \$3.50; ½ peak, \$3
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**Meat Cutters—**

See Cutters, Meat.

**Menders—**

Harness.....	50¢ doz., \$1.75
Hudson's Hose Menders, in set, 50¢ doz.....	\$6.00
Hudson's Hose Bands.....	50¢ gr., \$1.25

**Milk Cans—See Cans, Milk.****Mills—**

Box and Side, list Jan. 1, 1888.....	60¢80/100
Net prices are often made which are lower than above discont.	
American, Enterprise Mfg. Co., list Jan. 17, 1893.....	20¢
National List, Jan. 1, 1894.....	30¢
Swift, Lane Bros.....	30¢
Waddell's New Box Mills, Ideal Brand, New List.....	60¢80/100

**Mineral Knives—**

See Knives, Mining.

**Molasses Gates—**

See Gates, Molasses.

**Money Drawers—**

See Drawers, Money.

**Mowers, Lawn—**

Highest 10 in.....	12 in.....	14 in.....
grade, \$4.00 to \$5.25.....	\$4.50 to \$6.00.....	\$5.00 to \$6.75.....
Good.....	\$3.00.....	\$3.50.....
Cheap.....	2.25.....	2.50.....

**Muzzles—**

Safety..... 50¢ doz., \$3.00, 25¢

**Nails—**

Cut and Wire. See Trade Report. Wire Nails, Papered. Association list, May 1, '92..... 55¢10/25

Hungarian, Finishing, Upholsterers', &amp;c. See Tools.

**Horse—**

A. C.....	25¢ 23¢ 22¢ 21¢ 20¢	40¢10/10
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American..... 9½ 9¼ 9¼ 9¼ 9¼..... net

Anchor..... 23¢ 21¢ 20¢ 19¢ 18¢..... 35¢

Ausable..... 23¢ 21¢ 20¢ 19¢ 18¢..... 35¢

Capewell..... 19¢ 18¢ 17¢ 16¢ 15¢..... 10¢5½

C. B. K..... 25¢ 23¢ 22¢ 21¢ 20¢..... 40¢

Champion..... 25¢ 23¢ 22¢ 21¢ 20¢..... 10¢10/10

Champlain..... 25¢ 23¢ 22¢ 21¢ 20¢..... 10¢10/10

Clinton, Fin..... 19¢ 18¢ 17¢ 16¢ 15¢..... 40¢5½

Empire Bronzed..... 21¢11½¢

Essex..... 23¢ 21¢ 20¢ 19¢ 18¢..... 35¢

Lyra..... 9½ 9¼ 9¼ 9¼ 9¼..... net

Maud S..... 23¢ 21¢ 20¢ 19¢ 18¢..... 35¢

Northwest'n..... 23¢ 21¢ 20¢ 19¢ 18¢..... 35¢

Putnam..... 23¢ 21¢ 20¢ 19¢ 18¢..... 35¢

Snowden..... 9½ 9¼ 9¼ 9¼ 9¼..... net

Standard..... 23¢ 21¢ 20¢ 19¢ 18¢..... 35¢

Vulcan..... 23¢ 21¢ 20¢ 19¢ 18¢..... 35¢

Western..... 23¢ 21¢ 20¢ 19¢ 18¢..... 35¢

**Picture—**

Brass Head, Combination list..... 50¢10/10

Brass Head, Sargent's list..... 60¢80/100

Porcelain Head, Combination list..... 40¢10/10

Porcelain Head, Sargent's list..... 50¢10/10

Niles' Patent..... 40¢

**Nail Pullers—See Pullers, Nail.****Nail Sets—See Sets, Nail.****Nippers, See Pliers and Nippers****Nut Crackers—**

See Crackers, Nut.

**Nuts—List Dec. 18, 1889.**

Square, Hex.

Cold Punched..... 5.00¢ 5.10¢ off list

Hot Pressed..... 5.80¢ 6.50¢ off list

In packages of 100 lb, add 1-10¢ lb

net; in packages less than 100 lb, add ½¢ lb, net.

**Oakum—**

Best or Government..... 6½¢60/10

Navy..... 4½¢40/10

U. S. Navy..... 5½¢50/10

**Oil Tanks—See Tanks, Oil.****Oilers—**

Brass and Copper..... 50¢10/50¢10/85

Zinc and Tin..... 70¢40/10

Broughton's Brass..... 50¢

Broughton's Zinc..... 50¢

Malleable, Hammers' Improved, No. 1, \$3.80; No. 2, \$4.00; No. 3, \$4.40.....

Malleable, Hammers' Old Pattern, same..... 45¢

Olmstead's Brass and Copper..... 50¢

Olmstead's Tin and Zinc..... 60¢

Prior's Pat. or "Paragon" Brass..... 70¢

Prior's Pat. or "Paragon" Zinc..... 70¢

Steel, Draper &amp; Williams..... 50¢

Wilmot &amp; Hobbs Mfg. Co., Steel Anti-Rust..... 60¢

**Openers, Can—**

American..... 75¢ gross \$1.75 to \$2.00

Champion..... 75¢ doz \$2.00.....

Domestic..... 75¢ doz \$2.00.....

Duplex..... 75¢ doz \$2.00.....

Eureka..... 75¢ doz \$2.00.....

Excelsior, No. 1, 55¢; No. 2, \$1.50..... 45¢

French, No. 4..... 75¢ doz \$2.25, 55¢60¢

Iron Handle, No. 5..... 75¢ gr \$6.00, 45¢50¢

Lyman's..... 75¢ doz \$3.75, 20¢

Messenger's Comet..... 75¢ doz \$3.00, 25¢

Moore's..... 70¢

Sardine Scissors..... 75¢ doz \$2.75 to \$3.00

Sprague, No. 1, 55¢; No. 2, 80¢; No. 3, 60¢..... 45¢

Universal..... 75¢ doz \$3.00.....

World's Best..... 75¢ gross, No. 1, \$12.00; No. 2, \$24.00; No. 3, \$36.00..... 50¢10/10

**Packing, Steam—****Rubber—**

Standard, fair quality..... 70¢10/75¢

Inferior quality..... 75¢10/80¢

Extra..... 60¢30/100¢50

Jenkins' Standard..... 75¢ 80¢ 55¢25¢50

N. Y. B. &amp; P. Co., Double Diamond..... 60¢

N. Y. B. &amp; P. Co., Sealander..... 60¢

N. Y. B. &amp; P. Co., Carbon..... 70¢5½

**Miscellaneous—**

American Packing..... 14¢10/14¢

Cotton Packing..... 14¢10/14¢

Italian Packing..... 12¢10/13¢

Jute..... 6¢7½¢

Regia Packing..... 13¢10/14¢

**Pails—**

S. S. &amp; Co., 18-qt., \$7.00; 20-qt., \$7.25

50¢ doz.

**Galvanized Pails—**

Light..... Heavy.....

10 Quart..... \$2.00 to \$2.25..... \$2.25 to \$2.50

12 Quart..... 2.25 to 2.50..... 2.50 to 2.75

14 Quart..... 2.50 to 2.75..... 2.75 to 3.00

**Galvanized Buckets—**

Fire..... Well.....

10 Quart..... \$2.50 to \$2.75.....

12 Quart..... 2.75 to 3.00..... \$2.25 to \$2.50

14 Quart..... 3.00 to 3.25..... 2.50 to 2.75

**Indurated Fiber Ware**

Fire Pails, deep..... 50¢ doz \$4.80

Fire Pails, round bottom..... 50¢ doz \$5.40

Milk, 14 qt..... 50¢ doz \$5.40

Stable, 14 qt..... 50¢ doz \$6.00

Star Pails, 12 qt..... 50¢ doz \$4.20

**Standard Fiber Ware—**

Buggy Pails..... 50¢ doz \$3.00

Chamber Pails, 14 qt..... 50¢ doz \$7.00

Dairy Pails, 14 qt., 50¢ doz..... 4.25

Fire Pails, No. 1, 12 qt., 50¢ doz..... 3.75

Fire Pails, No. 2, 14 qt., 50¢ doz..... 4.25

Horse Pails..... 50¢ doz \$4.00

Slop Jars (bal. trap)..... 75¢ doz \$5.00

Sugar Pails..... 50¢ doz \$5.00

Water Pails, 12 qt., 50¢ doz..... 3.15

**Pans—**

Large sizes..... 50¢ doz \$5

Small sizes..... 50¢ doz \$5

Silver &amp; Co. (Covered)..... 50¢ doz \$5

**Fry—**

Standard List:

No..... 0 1 2 3 4

50¢ doz \$3.00 \$3.75 \$4.25 4.75 \$5.25

No..... 5 6 7 8 9

50¢ doz \$6.00 \$7.00 \$8.00 \$9.00 \$10.00

Polished, regular goods..... 75¢ doz \$10

Acme Fry Pans..... 60¢ doz

**Dust—**

Steel Edge, No. 1..... 50¢ doz \$1.75

**Roasting and Baking—**

Columbian, S. S. &amp; Co., Nos. 10, \$2; 20, \$2.25; 30, \$2.50 each..... 60¢10/10

**Paper and Cloth—**

List April 10, 1888..... 60¢10/60¢

Sibley's Emery and Crocus Cloth..... 30¢

**Parsers—****Apple—**

Advance..... 50¢ doz \$4.25

Baldwin..... 50¢ doz 4.75

Bonanza..... 50¢ doz 5.00

Daisy..... 50¢ doz 3.50

Eclipse..... 50¢ doz 3.50

Eureka, 1888..... 50¢ doz 16.00

Family Bay State..... 50¢ doz 12.00



**Pullers Nail-**

Galvanized, 24.00, 40%  
 Economy, 24.00, 40%  
 Economy, No. 2, 24.00, 40%  
 Giant, No. 2, 24.00, 40%  
 Pelican, 24.00, 40%  
 Spranton, 24.00, 40%

**Pulleys-**

Brass Screw, 70%  
 Hay Fork, "Anti-Friction," 5 in. solid, 50%  
 Hay Fork, "F" Common and Patent, 20%  
 Hay Fork, Moore's Anti-Friction 5 in. 20%  
 Wheel, 24.00, 40%  
 Hay Fork, Reed's Self-Lubricating, 40%  
 Hay Fork, Solid Eye, 24.00, 40%  
 Hay Fork, Stearns' Nos. 35 & 45, 50%  
 Hay Fork, Stearns' Nos. 15, 25, 35, 60, 60%  
 Hay Fork, Tarbox Pat. Iron, 20%  
 Hot House, Awning, 60%  
 Japanned Clothes Line, 80%  
 Japanned Screw, 70%  
 Japanned Side, 70%  
 Moore's Ceiling or End, Anti-Friction, 40%  
 Moore's Dumb Waiter, Anti-Friction, 60%  
 Moore's Electric Light, 38%  
 Moore's Side, Anti-Friction, 60%  
 Sash (Auger Mortise), 60%  
 Common Sense, 60%  
 Empire, 60%  
 Ideal, Nos. 2, 4, 10 & 16, 60% less 1¢  
 Star, 60%  
 Ideal, or IXL No. 60, 60% less 1¢  
 On bill, lots extra 60%  
 Shade Rack, 45%  
 Shepard's Niagara, No. 25, 2¢ doz 23¢  
 Tackle Blocks-See Blocks.

**Pumps-**

Clasien, Best Makers, 60%  
 Pitcher Spout, Best Makers, 70%  
 Pitcher Spout, Cheaper G'ds, 75%  
 Myers' Pumps, low list, 60%

**Punches-**

Avery's Revolving, 40%  
 Avery's Sawset and Punch-See Sawsets  
 Bemis & Call Co.'s Cast Steel Drive, 50%  
 Bemis & Call Co.'s Check, 55%  
 Bemis & Call Co.'s Spring, 50%  
 Bemis & Call Co.'s Springfield Socket, 65%  
 Niagara Forge Punches, 20%  
 Niagara Solid Punches, 15%  
 Rice Hand Punches, 15%  
 Saddler's or Drive, good, 40%  
 Spring, good quality, 2¢ doz, 60%  
 Spring, Leach's Pat., 15%  
 Solid Tinnings, P. S. & W. Co., 2¢  
 Tinnings' Hollow Punches, P. S. & W. Co., 20%  
 Co., 20%  
 Co., 20%

**Rail-**

Barn Door, Light, 1 in. 1/4, 2 1/2  
 Per 100 feet, 1.75 2.10 2.75  
 B.D. for N. E. H. H. Small, Med. Large,  
 Per 100 feet, 2.00 2.50 3.00 Net  
 Carrier, double braced, Steel Rail, 3/4  
 foot, 3/4  
 Lundy Parlor Door, Planed Edge, 7/8  
 Moody Steel Rail, 7/8, 50%  
 Moore's Steel Rail, 7/8, 50%  
 Sliding Door, Bronzed Wrt Iron, 7/8, 60%  
 Sliding Door, Iron, Painted, 60%  
 Sliding Door, Wrt Brass, 7/8, 35¢, 40%  
 Terry's Steel Rail, 7/8, 50%  
 Victor Track Rail, 7/8, 50%

**Rakes-**

Cast Steel, Association G'ds, 70%  
 Cast Steel, Outside G'ds, 70%  
 Malleable, good, 70%  
 Malleable, low grade, 75%  
 Fort Madison Prize Bow Brace and  
 Peerless, 65%  
 Fort Madison Steel Tooth Lawn Rake,  
 50.00, 25%  
 Gibbs, 24.00, 40%  
 Gibbs' Acme Lawn Rake, 24.00, 40%  
 Gibbs' Canton Lawn Rake, 24.00, 40%  
 Gibbs' Crown Lawn Rake, No. 1, 24.00, 40%  
 Gibbs' Favorite Lawn Rake, 24.00, 40%  
 Gibbs' Hustler No. 0, 24.00, 40%  
 Gibbs' Hustler No. 1, 24.00, 40%  
 Onondaga Lawn Rake, 24.00, 40%

**Razors-**

Campbell Cutlery Co., 50%  
 Electric Cutlery Co., Net prices  
 Galvanic, 24.00, 40%  
 Jordan's AAAA, new list, Net prices  
 Jordan's Old Faithful, new list, Net prices  
 E. Torrey Razor Co., Net prices  
 Wostenholm and Butcher, 10 to 2, 10%

**Razor Straps-**

See Straps, Razor.

**Reels-**

Clothes Line- 33%  
 Fishing- 33%  
 Hendryx Aluminum, German Silver,  
 Gold Bronze, Silver Rubber, Populo  
 and Salmon, Single Action, Multiply-  
 ing and Quadruple, all sizes, 25%  
 Hendryx Single Action Series, 102P  
 and PN, 202P and PN, 102PR and  
 PRN, 202PR and PN, 504P and  
 PN, 00304P and PN, 502 and 502N,  
 802 and 812N, 02084N, Competitor, 60%  
 Hendryx Multiplying and Quadruple  
 Series, 3004N and PN, 4N and PN,  
 2004N, 2004P and PN, 00204PN, 002  
 and 0024N, 5000N and PN, 40%  
 Registers- 70%  
 Moore's Bronze Finishes, 70%  
 Moore's Electroplated, 75%  
 Moore's Japanned, 75%  
 Moore's Solid Bronze, 65%  
 Moore's Stove Pipe, 38%

**Rings and Ringers-**

Bull Rings- 50%  
 Ellrich Hdw. Co., White Metal, low list,  
 50%  
 Hotchkiss' low list, 30%  
 Humason, Beckley & Co., 70%  
 Peck, Stow & W. Co., 50%  
 Sargent's, 75%  
 Union Nut Co., 65%  
 Hog Rings and Ringers-  
 Note: The market on Hog Rings and  
 Ringers is in a derelict condition  
 and prices are low and irregular. We  
 therefore withdraw quotations for the  
 present.

**Rivets and Burrs-**

Copper, 60%  
 Coppered Iron, Betina Brand, 50%  
 Iron Norway, list Nov. 17 '87, 60%  
 Second Quality, 70%

**Rivet Sets-See Sets.****Roasting and Baking Pans-See Pans, Roasting and Baking.****Rods-**

Stair, Black Walnut, 2¢ doz 40¢  
 Stair, Brass, 25¢ doz 30%

**Rollers-**

Acme Moore's Anti-Friction, 55%  
 Barn Door, Sargent's list, 60%  
 Moore's Barn Door Stay, 50%  
 Union Barn Door Roller, 70%  
 Thompson Mfg. Co.'s Lawn Rollers, 30%

**Rope-The following prices are f.o.b.**

New York or factory, and are shaded  
 1/2¢ on large lots; terms, 1 1/2% for  
 cash.  
 Manila, 7-16 in. diam. and  
 larger, 7/4¢ 7/4¢  
 Manila, 1/4 in. to 1-16 in., 7/4¢ 7/4¢  
 Manila, Tarred Rope, 6/4¢ 6/4¢  
 Manila, Hay Rope, Med'm, 7/4¢ 7/4¢  
 Sisal, 7-16 in. and larger, 5/4¢ 5/4¢  
 Sisal, 1/4 in. to 1-16 in., 5/4¢ 5/4¢  
 Sisal, 1/4 in. to 1-16 in., 5/4¢ 5/4¢  
 Sisal, Hay Rope, 5/4¢ 5/4¢  
 Sisal, Tarred Rope, 4/4¢ 4/4¢  
 Sisal, Medium Lath Yarn, 4/4¢ 4/4¢  
 New Zealand, 7-16 in. and  
 larger, 5/4¢ 5/4¢  
 New Zealand, 1/4 in. to 1-16 in., 5/4¢ 5/4¢  
 New Zealand, Hay Rope, 5/4¢ 5/4¢  
 New Zealand, Tar'd Rope, 4/4¢ 4/4¢  
 Jute Rope, 1/2 in. to 1-16 in., 5/4¢ 5/4¢

**Wire-**

List February, 1892, All kinds, 50%

**Rules-**

Boxwood, 80%  
 Ivory, 60%  
 Starrett's Steel Rules and Straight  
 Edges, 25%  
 Edges, 25%

**Sad Irons-See Irons, Sad.****Sand and Emery Paper and Cloth-**

See Paper and Cloth.

**Sash Cord-See Cord, Sash.****Sash Locks-See Locks, Sash.****Sash Weights-**

See Weights, Sash.

**Sausage Stuffers or Fillers-See Stuffers or Fillers, Sausage.****Saws-**

Note: Extra 50% often given.

Atkins' Circular, 50%  
 Atkins' Cross Cut, new list, 50%  
 Atkins' Mulay, Mill and Drag, 50%  
 Atkins' One-Man Saw, 40%  
 Atkins' Wood Saws, 40%  
 Diston's Circular, 45%  
 Diston's Cross Cut, list Jan. 1, 93, 40%  
 Diston's Hand, 25%  
 O. E. Jennings & Co.'s, 25%  
 Peace Circular and Mill, 45%  
 Peace Cross Cut, list Jan. 1, 93, 45%  
 Peace Hand, Panel and Rip, 25%  
 Richardson's Circular and Mill, 45%  
 Richardson's X Cut, list Jan. 1, 93, 45%  
 Richardson's Hand, 25%  
 Simonds' Circular Saws, 45%  
 Simonds' Crescent Ground Cross Cut  
 Saws, 30%  
 Simonds' Gang, Mill, Mulay and Drag  
 Saws, 45%  
 Wheeler, Madden & Clemson Mfg. Co.,  
 Cross Cuts, list Jan. 1, 1893, 45%  
 Hand, Panel and Rip, 30%  
 Woodrough & McFarlin, 45%  
 Cross Cuts, list Jan. 1, 1893, 45%  
 Hand, Panel and Rip, 25%  
 Hack Saws- 35%  
 Eureka and Crescent, 35%  
 Griffin's, complete, 40%  
 Griffin's Hack Saw Blade, 40%  
 Star Hack Saws and Blades, 25%

**Scroll-**

Barnes' Builders' and Cab Makers' \$15.25¢  
 Barnes' Scroll Saw Blades, 25%  
 Lester, complete, 10.00, 25%  
 Rogers, complete, 24.00, 25%

**Saw Frames-**

See Frames, Saw.

**Saw Sets-See Sets, Saw.****Saw Tools-See Tools, Saw.****Scale Beams-**

See Beams, Scale.

**Scales-**

Chattillon's Eureka, 25%  
 Chattillon's Favorite, 40%  
 Chattillon's Grocers' Trip Scales, 60%  
 Family, Turnbills, 30%  
 Hatch, Counter, No. 171, good quality,  
 7/4¢ doz 17.00¢ 18.00¢  
 Hatch, Tea, No. 161, 7/4¢ doz 18.00¢ 18.00¢  
 Richie Bros. Platform, 4¢ 40¢ 10¢  
 Union Platform Plain, 2¢ 40¢ 10¢  
 Union Platform, Striped, 2¢ 15¢ 3¢ 25¢  
 Scissors, Fluting, 45%  
 Scrapers-  
 Adjustable Box Scraper (S. R. & L. Co.),  
 60.00, 40%  
 Box, 1 Handle, 7/4¢ doz 24.00¢  
 2 Handle, 7/4¢ doz 30.00¢ 30.00¢  
 Deane Box and Ship, 20%  
 Ship, Common, 7/4¢ doz 35.00¢  
 Ship, R. I. Tool Co., 10%

**Screen Window and Door**

Frames-See Frames

**Screw Drivers-**

See Drivers, Screw.

**Screws-**

Bench, Iron, 55%  
 Bench, Wood, Hickory, 20%  
 Bench, Wood, Hickory, 20%  
 Hand, Wood, 25%  
 Hand, Grand Rapids, list, 35%

**Coach, Lag and Hand-Rail-**

Leg, Blunt Point, list Jan. 1, 1890,  
 80%  
 Coach and Lag, Gimlet Point, list Jan.  
 1, 1890, 80%  
 Hand Rail, Am. Screw Co., 75%  
 Hand Rail, H. & B. Mfg. Co., 70%  
 Hand Rail, Sargent's, 70%

**Jack Screws-**

Millers Falls, 50%  
 Millers Falls, Roller, 60%  
 P. S. & W., 35%  
 Sargent, 70%  
 Stearns, 40%

**Cork-**

Detroit Cork Screw Co., 33%  
 Humason & Beckley Mfg. Co., 40%  
 Williamson's, 38%  
 Williamson's Forged Worm, Apple-  
 wood, 50.00, 40%

**Machine-**

Flat Head Iron, 70%  
 Round Head Iron, 65%

**Wood-**

List January 1, 1891,  
 Flat Head Iron, 80%  
 Round Head Iron, 80%  
 Flat Head Brass, 80%  
 Round Head Brass, 75%  
 Flat Head Bronze, 80%  
 Round Head Bronze, 75%  
 Rogers' Drive Screws, 80%

**Scroll Saws-See Saws, Scroll.****Scythes-**

Grass, 40%  
 Grass, 40%

**Scythe Snaths-**

See Snaths, Scythe.

**Sets-****Awl and Tool-**

Aiken's Sets, Awls and Tools,  
 No. 20, 7/4¢ doz 10.00, 60%  
 Common Brad Sets,  
 No. 42, 10.50¢ No. 43, 12.50¢, 70%  
 Fray's Adj. Tool Hds., Nos. 1, 12, 2, 18,  
 3, 12, 4, 5, 7, 8, 7¢  
 Henry's Combination Haft, 7/4¢ doz 6.50¢  
 Millers Falls Adj. Tool Hds., No. 1, 12,  
 No. 4, 12; No. 5, 18, 25%  
 Stanley's Excellence,  
 No. 1, 7.50¢; No. 2, 4.00¢; No. 3,  
 5.50¢, 80%

**Nail-**

Round, 3/4 gr. \$3.25  
 Square, 3/4 gr. \$4.00  
 Buck Bros., 27%  
 Cannon's Diamond Point, 7/4 gr. \$12, 20%

**Rivet-**

Regular list, 70%

**Saw-**

Atkins' Criterion, 7/4 doz No. 1, 36.00¢  
 Atkins' Genuine, 13.00, 60%  
 Atkins' Imitation, 7/4 doz \$3.00¢ 3.25¢  
 Atkins' Lever, 7/4 doz No. 1, 36.00¢  
 Avery's Saw Set and Punch, 30%  
 Bemis & Call Co.'s Cross Cut, 30%  
 Bemis & Call Co.'s Plate, 20%  
 Bemis & Call Spring Hammer, 30%  
 Common Lever, 7/4 doz \$2.00, 45%  
 Crescent, 7/4 doz \$3.00, 45%  
 Croissant (Keller), No. 1, 15.00¢; No. 2,  
 40%  
 Diston's Star, 40%  
 Hammer, Bemis & Call Co.'s new Pat. 45%  
 Hammer, Hotchkiss, 55.00, 10%  
 Hart's Pat. Lever, 20%  
 Kohler's King Royal, 7/4 doz \$12.00¢  
 Kohler's Royal, 7/4 doz \$7.00¢  
 Leach's, No. 0, 8.00¢; No. 1, 15.00¢  
 Leopold, 40%  
 Lloyd's Acme, 7/4 doz \$15, 40%  
 Morrill's No. 1, 15.00¢, 40%  
 Nos. 3 and 4, Cross Cut, 23.00, 40%  
 No. 5, Mill, 31.00¢, 40%  
 No. 10, 15.00¢, 40%  
 No. 11, 15.00¢, 40%  
 Nash's, 20%  
 Stillman's Genuine, 7/4 doz \$5.00¢ 7.75¢,  
 40%  
 Stillman's Pattern, Hand, 7/4 doz \$3.25¢,  
 Cross Cut, 55.00¢, 55%  
 Taintor Positive, 7/4 doz \$18, 50%

**Sharpeners, Knife-**

Parkin's,  
 Applewood Handles, 7/4 doz \$6.00, 50%  
 Rosewood or Cocobolo, 7/4 doz \$6.00, 50%  
 Tanite Mills, 7/4 gr. \$14.40, 25% 33%

**Shaves, Spoke-**

Iron, 45%  
 Wood, 50%  
 Bailey's (Stanley R. & L. Co.), 50%  
 Cincinnati, 25%  
 Goodell's, 7/4 doz \$9.00, 25%  
 Stearns, 40%

**Shears-**

Acme Cast Shears, 10%  
 American (Cast) Iron, 10%  
 Barnard's Lamp Trimmers, 7/4 doz \$8.75¢  
 Barnard, Solid Steel Blade, Jap'd, 75%  
 Barnard, Solid Steel Blade, Nickleed, 65%  
 Cast Shears, 30%  
 First quality, 80%  
 Second quality, 60%  
 Campbell Cutlery Co., Jap'd, 75%  
 Nickel Plated, 65%  
 Claus brand, Japanned, 70%  
 Claus brand, Nickleed, 60%  
 10%  
 Davenport Cutlery Co., 60%  
 Diamond Cast Shears, 10%  
 Galvanic 9 to 10 lb., 7/4 doz \$1.00, 1/4 inch  
 Hatch Cutlery Co. Solid Steel Forged,  
 00¢ 60%  
 Heinisch's, list Dec. 1881, 60%  
 Heinisch's Tailor's Shears, 33%  
 Howe Bros. & Hulbert, Solid Forged  
 Steel, 40%  
 Seymour's, list Dec. 1881, 40%  
 Victor Cast Shears, 75%  
 Tinnings' Snips-  
 Cast Handles, laid with Steel, 40%  
 Niagara Snips and Shears, 30%  
 Wrt. Handles, Steel Blades, 7/4, 20%

**Pruning Shears and Hooks**

Diston's Combined Pruning Hook  
 and Saw, 7/4 doz \$18.00, 20%  
 Diston's Pruning Hook, 7/4 doz \$12.00,  
 20%  
 Dunlap's Saw and Chisel, 7/4 doz \$5.50, 30%  
 Henry's Pruning Shears, 7/4 doz \$4.00,  
 20%  
 Henry's Tree Pruner, 50%  
 K. S. Lee & Co.'s Pruning Tools, 60%  
 Levin Pruner No. 1, 15.00¢ 7/4 doz, 40%  
 Levin Pruner No. 2, 22.00¢ 7/4 doz, 40%  
 J. M. Mallinson & Co., 55%  
 Pruning Shears, Henry's Pat., 7/4 doz,  
 30%  
 Pruning Shears, Conn. Pat., 25%  
 P. S. & W. Co., 60%  
 Wheeler, M. & C. Co., Combination,  
 7/4 doz \$12.00

**Tinners' &c.-**

Shears and Snips (P. S. & W.), 20%  
 Snips, J. Mallinson & Co., 33%

**Sheaves-****Sliding Door-**

Corbin's list, 60%  
 M. W. Co., list July, 1888, 60%  
 Moore's Anti-Friction, 60%  
 Patent Roller, Hatfield's, 60%  
 R. & E., list Dec. 18, 1885, 55%  
 Russell's Anti-Friction, list Dec. 18,  
 1885, 60%

**Sliding Shutter-**

Reading list, 60%  
 R. & E., list Dec. 18, 1885, 60%  
 Sargent's list, 70%

**Shells-**

Brass Shot Shells, Club, Rival, Climax

Brass Shot Shells, 1st quality, 60%  
 First quality 4, 8, 10 and 12 gauge,  
 25%  
 First quality Rival, Club and Climax  
 brands, 14, 16 and 20 gauge (37.50  
 list), 20%  
 Prize, 40%  
 Smokeless brand, 12, 10, 16 gauge, 35%  
 Star, Club, Rival and Climax Brands,  
 35%  
 Trap brand, 12 and 10 gauge, 35%  
 Shells, Loaded-  
 Standard list, July 19, 1890,  
 40%  
 2% cash, 10 days.

**Ship Tools-**

L. & J. White, 20%

**Shoes, Horse, Mule, &c.-****Horse-**

Burden's, Perkins', Phoenix, Standard,  
 Diamond State, Bryden's Bow and  
 Crescent, \$3.50¢ \$4.00¢  
 Bryden's Frog Pressure, at factory, \$5.00

**Mule-**

Add 1¢ keg to above prices.

**Ox Wrought-**

Ton lots, 90¢  
 1000 lb lots, 90¢  
 500 lb lots, 90¢

**Shot-**

Drop, up to B, 25-m bag, \$1.15  
 Drop, up to B, 5-m bag, 35¢  
 Drop, B and larger, 25-m  
 bag, 1.40  
 Drop, B and larger, 5-m  
 bag, .40  
 Bag and Chilled, 25-m  
 bag, 1.40  
 Bag and Chilled, 5-m bag, .40  
 Dust Shot, 25-m bag, 2.00  
 Dust Shot 5-m bag, .45

**Shovels and Spades-**

Ames' Shovels, Spades, &c., list Nov. 1,  
 1885 (Except Nos. named below), 20%  
 The following Nos. are subject to a dis-  
 count of 27 1/2%: Nos. 543 to 572, 533  
 to 580, and Nos. 1000, 1009, 1014, 1019,  
 1024, 1027 and 1029.

Griffith's Black Iron, 50%  
 Griffith's C. S., 60%  
 Griffith's Solid C. S. R. Goods, 20%  
 Hubbard & Co., Antrim list, 25%  
 Hubbard & Co's. Chisholm Pat., 50%

**Shovels and Tongs-**

Brass Head, 60%  
 Iron Head, 60%

**Sieves and Sifters-**

A. & W. Sifters, 7/4 doz \$15.00,  
 50%  
 Buffalo Metallic, S. S. & Co., 50%  
 Electric Light, 7/4 doz \$10, 7/4 gr \$15.00,  
 Hunter's Genuine, 7/4 doz \$1.75, 7/4 gr \$16.50  
 Hunter's Imitation, 7/4 doz \$1.75, 7/4 gr \$15.00

**Sinks**

Standard list, 65%

**Cast Iron-**

Wrought Steel-

Columbus, Galvanized and ungalvanized,  
 60%  
 Columbus, Painted or Unpainted, 80%  
 New Era, Painted,

**Snaps, Harness, &c.**  
Anchor A. & S. Mfg. Co., 60%  
Andrews, 60%  
Covert's Saddlery Works' Triumph, 38%  
Covered Spring, 60%  
Covert, 60%  
Covert, New Patent, 60%  
Covert, New R. E., 60%  
Fitch's (Bristol), 60%  
German, new list, 40%  
Hotchkiss, 10%  
Kelley & Woolworth's Steel Harness, 50%  
John Prots Snaps, 75%  
Sargent's Patent Guarded, 70%

**Snaths**  
Scythe, 50%

**Soldering Irons**  
See Irons, Soldering.

**Spittoons, Cuspidors, &c.**  
Standard Fiberglass  
Cuspidors, 8 1/2 inch, No. 5, \$8; No. 6, \$9.  
Spittoons, Daisy, 8 inch, No. 1, 10 and 11 inch, \$6.

**Spike Shaves**  
See Shaves, Spoke.

**Spike Trimmers**  
See Trimmers, Spoke.

**Spoons and Forks**  
Tinned Iron

Basting, Cen. Stamp. Co.'s list, 70%  
Buffalo, S. S. & Co., 35%  
Solid Table and Tea, Cen. Stamp. Co.'s list, 70%

**Silver Plated**  
4 months or 5% cash 30 days

L. Boardman & Son, 50%  
Holmes & Edwards Silver Co., 40%  
Meriden Brit. Co., Rogers, 40%  
Reed & Barton, 40%  
Rogers & Bros., 40%  
C. Rogers & Hamilton, 40%  
Rogers & Hamilton, 40%  
Wm. Rogers Mfg. Co., 40%  
Simpson, Hall, Miller & Co., 40%

**Miscellaneous**  
Boardman's Britannia Spoons, case lots, 60%  
Boardman's Nickel Silver, list July 1, 1891, 60%  
Britannia, 60%  
German Silver, 60%  
Nickel Silver, 60%  
Holmes & Edwards Silver Co., 50%  
No. 24 German Silver, 50%  
No. 30 Silver Metal, 50%  
No. 49 Nickel Silver, 50%  
No. 50 Nickel Silver, 50%  
No. 67 Mexican Silver, 50%  
Rogers & Hamilton, 40%  
Cimeter, Flatware, 40%  
Cimeter, Steel Goods, 40%  
Crown Hamilton, Flatware and Cutlery, 30%  
Steel Goods, 40%  
Wm. Rogers Mfg. Co., 40%  
18% Rogers' German Silver, 60%  
22% Rogers' Nickel Silver, 50%  
Rogers' Silver Metal, 50%

**Springs - Door**  
Champion (Coll), 60%  
Cowell's, No. 1, \$18.00; No. 2, \$15.00  
Gem (Coll), list April 19, 1888, 60%  
Hercules, 60%  
Phoenix, complete, \$4.50; \$5.50  
Star (Coll), list April 19, 1888, 60%  
Torrey's Rod, 39 in., \$12.00; 41 in., \$13.00  
Warner's No. 1, \$15.00; No. 2, \$18.00  
Victor (Coll), 60%

**Carriage, Wagon, &c.**  
Elliptic, Concord, Platform and Half Scoll, 60%  
Oult's Bolster Springs, 25%

**Sprinklers, Lawn**  
Gibbs' Arc, \$12.00; \$8.00  
Gibbs' Hustler, \$12.00; \$8.00

**Squares**  
Nickel-Plated, 80%  
Steel and Iron, 80%  
Try Square and T Bevels, 60%  
Avery's Bevel Protractor, 50%  
Avery's Flush Bevel Squares, 40%  
Diston's Try Square and T Bevels, 50%  
Starrett's Micrometer Caliper Squares, 25%

**Squeezers**  
Winterbottom's Try and Miter, 30%

**Fodder**  
Blair's, \$2.00; \$1.00  
Blair's "Climax", \$2.00; \$1.00

**Lemon**  
Porcelain Lined, No. 1, \$8.00; No. 2, \$6.00

Wood, Common, \$1.70; \$1.75  
Wood, No. 2, \$2.00; \$2.05  
Dean's, No. 1, \$2.00; \$2.05  
Dean's, No. 2, \$2.00; \$2.05  
Queen, \$2.50  
Dunlap's Improved, \$3.75; \$2.00  
Hotchkiss Straight Flash, \$12.00  
Jennings' Star, \$2.50  
King, \$4.00; \$2.50  
Little Giant, \$5.00; \$2.50  
Sammis, No. 1, \$5.00; No. 2, \$3.00  
The Boss, \$2.50; \$2.50

**Standard Fiber Ware**  
See Ware, Standard Fiber.

**Stables**  
Barbed Blind, 1/2 in. and larger, \$7.75; \$8.00  
Barbed Blind, 1/2 in., \$8.00; \$8.00  
Fence Staples, Galvanized, Same price as Barbed Wire  
Fence Staples, Plain, Same price as Barbed Wire  
Grand Crossing Tack Co.'s list, 75%  
C. & A. Hoffmann's, 40%  
Nichols Bros., 50%

**Steelyards**  
Stocks and Dies

Blacksmith's  
Butterfield's Goods, 35%  
Watford Goods, 35%  
Gardner, 35%  
Green River, 35%  
Lighting Screw Plate, 25%  
Reece's New Screw Plates, 35%  
Reversible Ratchet, 30%

**Stone**  
Stones, Grind-See Grindstones.

**Scythe Stones**  
Pike Mfg. Co., list April, 1892, 35%  
Cleveland Stone Co., list Nov 1892, 35%

**Oil Stones, &c.**  
Pike Mfg. Co., 35%  
Hindustan No. 1, \$1.00; \$1.00  
Sand Stone, 40%  
Turkey Oil Stone, 4 to 8, 10%  
in, 80%  
Turkey Slips, \$2.00  
Lily White Washita, 60%  
Rosy Red Washita, 60%  
Washita Stone, Extra, 60%  
Washita Stone, No. 1, 40%  
Washita Stone, No. 2, 30%  
Lily White Slips, 90%  
Rosy Red Slips, 90%  
Washita Slips, Extra, 80%  
Washita Slips, No. 1, 70%  
Arkansas Stone, No. 1, 8 to 15 in., \$2.80  
Arkansas Stone, No. 10, 4 to 8 in., \$3.50  
Lake Superior, \$1.00  
Lake Superior Slips, \$1.00  
Tanite Mills, \$1.00  
Emery Oil, \$9.00; \$5.00

**Stops, Bench**  
Cincinnati, 25%  
Crescent, \$1.50  
Hotchkiss, \$1.00; \$1.00  
McGills, \$3.00  
Millers Falls, 25%  
Morrill's, \$1.00; \$1.00; No. 2, \$1.00  
Stearns', 40%  
Terrell's Nos. 1 and 2, \$3.00; \$3.00  
Weston's, No. 1, \$1.00; No. 2, \$1.00; \$1.00

**Stove Polish**  
See Polish, Stove.

**Stretchers Carpet**  
Cast Iron, Steel Points, \$7.00; \$7.00  
Cast Steel, Polished, \$2.25  
Socket, \$1.75  
Bulard's, 25%  
Strops, \$2.00

**Strops, Razor**  
Baker's Belt and Com., \$2.00  
Campbell Cutlery Co., Net prices  
Electric Cutlery Co., Net prices  
Genuine Emerson, 60%  
Imitation, \$2.00; \$2.00  
Jordan's Pat. Padded, list Nov. 1, 89, 50%  
Lamont Combination, \$4.00  
Torrey's, Net prices

**Stuffer Sausage**  
Miles' Challenge, \$2.00; \$2.00  
Perry, \$1.00; \$1.00; No. 0, \$2.00  
Draw Cut No. 4, each \$30.00, 20%  
Enterprise Mfg. Co., list Jan 17, '93, 25%  
Silver's, 40%

**Sweepers, Carpet and Lawn**  
Aome, \$2.00  
Advances, \$18.00  
Banner Jap'd, \$22.00; Nickel, \$24.00  
Grand, \$38.00  
Gold Medal, \$27.00  
Prize, \$27.00  
Superior, \$27.00  
Cocompifant, \$27.00  
Furniture Protector, Jap., \$24.00  
Furniture Protector, Nickel, \$27.00  
Inter Ocean, \$37.00  
Hall, \$48.00  
Crown Jewel, No. 1, \$18.00; No. 2, \$19.00; No. 3, \$20.00  
Domestic, No. 2, \$22.00  
Easy Jap'd, \$22.00; Nickel, \$24.00  
Excelsior, \$22.00  
Garland, \$18.00  
Gilt Edge, \$24.00  
Grand Rapids, \$24.00  
Grand Republic, \$24.00  
Housewife's Delight, \$15.00  
Imperial, \$28.00  
Improved Parlor Queen, \$24.00  
Japanned, \$27.00  
Nickel, \$27.00  
Ladies' Friend, \$15.00  
Ladies' Friend No. 2, \$16.00  
Model, \$27.00  
Parlor Queen, \$24.00  
Our Leader, \$19.00  
Our Own, \$27.00  
Rapid Jap'd, \$22.00; Nickel, \$24.00  
Reliable, \$22.00  
Select, \$24.00  
Standard, \$24.00  
Supreme, \$22.00  
The Star, \$21.00  
Triumph, \$20.00  
Bissell Carpet Sweeper Co. make the following rebates:  
\$2.00 per doz. in 5 doz. lots.  
\$2.00 per doz. in 10 doz. lots.

**Lawn**  
Thompson Mfg. Co., 30%  
Davies Lawn, 25%

**Tacks, Brads &c.**  
List Oct 10, 1889. Our established straight weights. Short weight goods are sold at lower prices.

**Carpet Tacks**  
American, Blued, 47%  
American, Tind and Cop'd, 52%  
Steel, Bright and Blued, 52%  
Steel, Tinned and Coppered, 52%  
Swedes Iron, S. S., Blued, 40%  
Swedes Iron, S. S., Tinned, 47%  
American Iron Tacks, Domestic, 37%  
American Iron Tacks, Foreign, 50%  
Swedes Iron Tacks—  
S. S., Blued, 37%  
S. S., Tinned, 40%  
Lanc, Blued, 30%  
Lanc, Tinned, 37%  
Upholsterers' S. S., 47%  
Upholsterers', Lanc, 37%  
Gimp Tacks—  
S. S., Blued, 30%  
S. S., Tinned, 42%  
Lanc, Blued, 30%  
Lanc, Tinned, 35%  
Basket and Trimmers' Tacks—  
Lanc, 20%  
S. S., 30%  
Hungarian Nails, 35%  
Common and Patent Brads, 35%  
Leathered Tacks, 5%  
Brush Tacks and Nails, S. S., 20%  
Looking Glass Tacks, S. S., 5%  
Picture-Frame Points, S. S., 12%  
Lace Tacks, Blued, 12%  
Lace Tacks, Tinned, 20%  
Finishing Nails, 62%  
Trunk and Clout Nails, 62%  
Black, 62%  
Tinned or Coppered, 67%  
Basket Nails, 87%  
Chair Nails, 35%  
Cigar Box Nails, 30%  
Tin Capped Nails, 60%

**Miscellaneous**  
Double Point, 80%  
Wire Carpet Nails, 60%  
Bill Nye Brad Box, 4.00  
Bonnie Blue, box \$1.40  
Claw Handle Carpet, gross \$4.00  
Home Tacks, No. 50, case (12 car- tons), \$36.00; No. 100, case (12 car- tons), \$72.00  
Home Nails, No. 200, case (12 car- tons), \$30.00; No. 400, case (12 car- tons), \$60.00  
Parisian Gilt Nails, cartoon, 50  
Plymouth Rock Carpet Tacks, 20%  
Upholsterers' Nails, 50%

**Wire Brads and Nails**  
Steel-Wire Brads, R. & E. Mfg. Co.'s list, 50%

**Tanks, Oil**  
Emerald, S. S. & Co.: 30-gal. \$3.75; 60-gal., \$11 each, 50%

**Tapes, Measuring**  
American, 10%  
Chesterman's, Regular list, 25%  
Excelator, Special list, 20%  
Spring, 40%

**Thermometers**  
Tin Case, 80%

**Thimble Skeins**  
See Skeins.

**Ties, Bale**  
Steel.  
Standard Wire, list, 50%

**Tinners' Shears, &c.**  
See Shears, Tinners' &c.

**Tinware**  
Stamped, Japanned and Pleased, list Jan 20, 1887, 70%

**Tire Benders, Upsetters, &c.**  
See Benders and Upsetters, Tire.

**Tobacco Cutters**  
See Cutters, Tobacco.

**Tools**  
Coopers'—  
Albertson Mfg. Co., 25%  
Bartlett's, 20%  
Beatty's, 35%  
Bradley's, 20%  
Sandusky Tool Co., 30%  
Shaves Cincinnati Tool Co., 20%  
L. & J. White, 20%

**Lumber**  
Cant Hooks, "Blue Line", \$16.00  
Cant Hooks, Common Finish, \$14.00  
Cant Hooks, Mail Socket Clasp, "Blue Line", Finish, \$16.00  
Cant Hooks, Mail Socket Clasp, Common Finish, \$14.00  
Cant Hooks, Clip Clasp, "Blue Line", Finish, \$14.00  
Cant Hooks, Clip Clasp, Common Finish, \$12.00  
Hand Spikes, \$6 ft., \$15.00; 8 ft., \$20.00  
Pike Poles, Pike & Hook, \$12.00; \$11.50; 14 ft., \$12.50; 16 ft., \$14.50; 18 ft., \$17.50; 20 ft., \$21.50  
Pike Poles, Pike only, \$12.00; 14 ft., \$11.00; 16 ft., \$13.00; 18 ft., \$16.00; 20 ft., \$20.00  
Pike Poles, not hooked, \$12.00; 14 ft., \$11.00; 16 ft., \$13.00; 18 ft., \$16.00; 20 ft., \$20.00  
Mail Iron Socket Peavies, \$19.00  
Ring Peavies, "Blue Line", \$20.00  
Ring Peavies, Common, \$18.00  
Steel Socket Peavies, \$21.00  
Setting Poles, \$17.00; 14 ft., \$14.00; 16 ft., \$15.00; 18 ft., \$17.00  
Swamp Hooks, \$18.00

**Saw**  
Atkins', new list, 40%  
Simonds', 35%

**Transom Lifters**  
See Lifters, Transom.

**Traps**  
Game—  
Blake's Patent, 40%  
Newhouse, 40%  
Oneida Pattern, 75%

**Mouse and Rat**  
Cyclone, \$5.25  
Dandy, \$1.75  
Hotchkiss Metallic Mouse, 5-hole traps, \$7.50; in full cases, \$6.00  
Hotchkiss Imp. Rat Killer, \$18.50  
Hotchkiss New Rat Killer, \$18.50  
Ideal, \$10.00  
Mouse, \$10.00  
Mouse, Cage, Wire, \$2.50  
Mouse, Catch-em-alive, \$2.50  
Mouse Wood, Choker, \$2.00  
Mouse, Round Wire, \$1.50  
Rat, Decoy, \$10.00  
Schuyler's Rat Killer, \$15.00  
Waddell's Go Bang, \$12.50

**Fly**  
Balloon, Globe or Acme, \$1.50; \$1.50  
Harper, Champion or Paragon, \$1.50  
\$1.75; \$1.75

**Trimmers**  
Butter and Cheese, 25%

**Trimmers, Spoke**  
Bonney's, \$10.00; \$10.00, 50%  
Ives', No. 1, \$15.00; No. 2, \$12.00, 20%  
Stearns', 55%  
Douglas', \$2.00; \$2.00, 25%  
Cincinnati, 25%

**Bricks**  
Brade's Brick, 25%  
Clement & Maynard's, 30%  
Diston's Brk and Plastering, 25%  
Lothrop's Brick and Plastering, 20%  
Peace's Plastering, 25%  
Reed and Plastering, 15%  
Rose's Brick, 25%  
Worrall's Brick and Plastering, 20%  
Cleves' Angle Trowel, \$1.00; \$1.00, No. 2, \$3.00; No. 5, \$1.00, net 10%  
Garden, 70%

**Trucks, Warehouse, &c.**  
B. & L. Block Co.'s list, 40%  
Barnes' Barrel Trucks, 40%  
Daisy Stove Trucks, Improved pattern, \$1.00  
Thompson Mfg. Co., 40%

**Tubes, Boiler**  
See Pipe.

**Twine**  
Flax Twine—  
No. 9, 10 and 11 B. Balls, 22%  
No. 12, 14 and 16 B. Balls, 18%  
No. 18, 20 and 22 B. Balls, 17%  
No. 24, 26 and 28 B. Balls, 17%  
No. 30, 32 and 34 B. Balls, 16%  
Chalk Line, Cotton, 3 1/2 B. Balls, 8%  
Cotton Mosa, 6.9, 12.5 B. to doz., 15%  
Cotton Wrapping, 5 Balls to doz., 13%  
2-Ply Hemp, 1/2 and 3/4 B. Balls (Spring Twine), 10%  
3-Ply Hemp, 1 B. Balls, 10%  
3-Ply Hemp, 1 1/2 B. Balls, 10%  
3, 4 and 5 Ply Jute, 3 1/2 B. Balls, 8%  
Mason Line, Linen, 1/2 B. Balls, 5%  
No. 284 Mattress, 1/2 and 3/4 B. Balls, 5%  
Paper, 10%  
Wool, 5%

**Vises**  
Solid Box, 50%

**Parallel**  
Backus and Union, 40%  
Conner's, 40%  
Double Screw, 15%  
Flaher & Norris Double Screw, 15%  
Hollands', 35%  
Howard's, 40%  
Massey Quick Action, 20%  
Merrill's, 15%  
Miller's Falls, 40%  
Moore's, 20%  
Parker's, 20%  
Prentiss, 20%  
Sargent's, 70%  
Simpson's Adjustable, 40%  
Stephens', 25%  
Trenton, 40%  
Wilson's, 55%

**Saw Filers**  
Bonney's, Nos. 2 & 3, \$15.00; 40%  
Economy, \$10.00; \$10.00, 120%  
Hopkins', \$17.50; 10%  
Reading Common, Nos. 0, 1, 2 & 3, 50%  
Stearns' Rubber Jaw, Nos. 1 & 2, 33%  
Westworth, 20%

**Miscellaneous**  
Bauer's Pipe Vises, 10%  
Cincinnati, 25%  
Cowell Hand Vises, 20%  
Enterprise Pipe Vises, each \$3.00, 40%  
Massey Combination Pipe Vise, 40%  
Phoenix Vises, 35%  
Phoenix Hand Vises, \$3.60, 35%

**Wads-Price Per M.**  
U.M.C. & W.R.A.—B. E., 11 up, 68¢  
U.M.C. & W.R.A.—B. E., 9 & 10, 82¢  
U.M.C. & W.R.A.—B. E., 8, 96¢  
U.M.C. & W.R.A.—B. E., 7, 11.10  
U.M.C. & W.R.A.—P. E., 11 up, 1.15  
U.M.C. & W.R.A.—P. E., 9 & 10, 1.50  
U.M.C. & W.R.A.—P. E., 8, 1.70  
U.M.C. & W.R.A.—P. E., 7, 1.80  
Eley's B. E., 11 and larger, \$1.70; \$1.75  
Eley's P. E., 12 to 20, \$3.00; \$3.25

**Wagon Boxes**  
See Boxes, Wagon.

**Wagon Jacks**  
See Jacks, Wagon.

**Ware, Hollow**  
Cast Iron, Hollow—  
Stove Hollow Ware—  
Ground, 60%  
Unground, 65%  
Gray Enameled Ware—  
Stove Kettles, 60%  
Boilers and Saucepans, 40%  
White Enameled Ware—  
Maslin Kettles, 70%  
Boilers and Saucepans, 60%  
Rustless Hollow Ware, 60%  
Tinned Boilers and Spans, 60%

**Enameled**  
Agate and Granite Ware, list Jan. 1, 1894, 25%  
Ironclad Enameled Ware, Old list, 50%

**Kettles**  
Galvanized Tea-Kettles—  
Inch, 6 7 8 9  
Each, 55¢ 60¢ 65¢ 75¢  
Steel Hollow Ware.  
Avery Spiders and Griddles, 60%  
Avery Kettles, 60%

**Standard Fiber**  
Per Doz.  
Plain. Decorated.  
Cuspidors, \$7.50  
Half-peck Measure, \$3.00  
Peck Measure, 3.50  
Keelers, 1 1/2 in., 3.00  
Keelers, 2 in., 4.00  
Wash-Basins, 10 in., 1.80  
Wash-Basins, 12 in., 2.00  
See also Falls.

**Indurated Fiber**  
Basins, Ringed, \$2.80  
Butter Bowls, 15 and 18-inch (3 pieces), \$2.50  
Keelers, Nested, No. 1, 2, 3 and 4 (4 pieces), \$2.55  
Liquid Measures, pt., qt., and funnel (4 pieces), \$1.20  
Spittoons, No. 2, \$3.00  
Washbasins, Nested, Nos. 0, 1, 2, and 3 (4 pieces), \$5.75  
See also Falls.

**Silver Plated, Hollow**  
4 mo. or 5% cash in 30 days  
Meriden Britannia Co., 40%  
Reed & Barton, 40%  
Rogers & Brother, 40%  
Simpson, Hall, Miller & Co., 40%  
Hamford Silver Plate Co., 40%  
William Rogers Mfg. Co., 40%

**Washers**  
Rise hole, 5-16 3/4 5/16  
Washers, 5/16 3/4 5/16  
In lots less than 2000, \$1.00, add 1/4, 5 boxes 1¢ to list.

**Washer Cutters**  
See Cutters, Washers.

**Water Coolers**  
See Coolers, Water.

**Wedges**  
Iron, \$2.00; \$2.00, 2 1/2  
Steel, \$2.00; \$2.00, 2 1/2

**Weights Sash**  
Ton lots at foundry, \$15.00; \$16.00

**Well Buckets Galvan- ized**  
See Pails, Galvanized.

**Wheels Well**  
8 in., \$2.00; 10 in., \$2.50; 12 in., \$3.00



**Whips**

American Whip Co.: Length.	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8 ft.
X. L. Whalebone Driving.....	\$18.00	20.00	22.00	24.00	27.00	30.00	33.00	36.00
Eureka, Two-thirds Whalebone.....	15.00	16.50	18.00	20.00				
Bull Bone, Half-length Whalebone.....			11.00	12.00	13.00	15.00		
American Standard.....	8.00	8.50	9.50	10.50	12.00	13.50	15.00	16.50
True Grip, Raw Hide Center.....	6.00	6.00	6.50	7.00	7.50	8.00		
New Name, Stocked Java, Black and Wine Colors.....				6.00				
American, 98 Pen Whip.....				6.00				
Gents' Light Driving No. 111.....				6.00				
Gents' Light Driving No. 106.....				5.00				
Hand-made Stocked Java No. 108.....			8.75	4.00				
A large variety of cheaper grades.....								\$2.00 to \$3.00
Team Whips.....								\$2.00 to \$3.00
Toy Whips.....								\$2.50 to \$3.00
Hardware Assortment, 10/American, 75 Whips for \$50.00.								

**Wire and Wire Goods—****Iron—**

Market,

Br. & Ann., Nos. 0 to 18.....	75¢ to 10¢
Cop'd, Nos. 0 to 18.....	75¢ to 10¢
Galv., Nos. 0 to 18.....	75¢ to 10¢
Tin'd, Tin'd Hat, Nos. 0 to 18.....	70¢ to 10¢

Stone, Br. and Ann'd, Nos. 16 to 18.....	80¢
Nos. 19 to 23.....	80¢ to 85¢
Nos. 27 to 36.....	85¢ to 90¢
Ann'd Wire on Spools.....	80¢
Brass, Hat Jan. 18, 1894.....	40¢ to 45¢
Cast Steel Wire.....	50¢
Galvanized Fence.....	40¢ to 45¢
Copper, Hat Jan. 18, 1894.....	75¢ to 80¢
Malin's Ann'd and Tin'd on Spools.....	60¢ to 65¢
Malin's Brass and Cop. on Spools.....	50¢ to 55¢

Steel Music Wire, 13 to 30, imported.....	60¢ to 70¢
Stub's Steel Wire.....	36.00 to 2.30
Tate's Spooled, Tin'd & Annealed.....	60¢ to 65¢
Tate's Spooled Cop. and Brass.....	50¢
Tinned Broom Wire, 13 to 21, B. B. & C.....	45¢
Wire Clothes Line, see Linea.	
Wire Picture Cord, see Cord.	

**Bright Wire Goods—**

Standard list.....	90¢ to 95¢
Wire Cloth and Netting—	
Galvanized Wire Netting.....	80¢ to 85¢

Painted Screen Cloth 7 100 ft. \$1.45 to \$1.50

**Wire Barb—**

See Trade Report.

**Wire Rope—See Rope, Wire.****Wrenches—**

American Adjustable	40¢
Barter's Adjustable "g".....	40¢ to 50¢
Barter's Diagonal.....	60¢
Coe's Genuine.....	50¢ to 55¢
Coe's "Mechanics".....	50¢ to 55¢
Girard Standard.....	65¢ to 70¢
Lamson & Sessions' Engineers'.....	60¢ to 65¢
Lamson & Sessions' Standard.....	70¢ to 75¢
Lamson & Sessions' Agric'l.....	75¢ to 80¢
P. S. & W. Agricultural.....	80¢ to 85¢
W. & B. Diamond.....	50¢ to 55¢
Acme, Bright.....	50¢ to 55¢
Acme, Nickeled.....	40¢ to 45¢

Alken's Pocket (Bright).....	\$6.00, 50¢ to 10¢
Alligator.....	50¢
Always Ready.....	25¢ to 30¢
Bemis & Call's:	
Adjustable S.....	35¢ to 40¢
Briggs' Pattern.....	40¢ to 45¢
Combination Black.....	40¢ to 45¢
Combination Bright.....	40¢ to 45¢
Cylinder or Gas Pipe.....	45¢ to 50¢
Extra Heavy.....	45¢
Merrick's Pattern.....	45¢
No. 3 Pipe Bright.....	55¢
Bit Wrench, Adj., Tatum's.....	75¢ doz., \$2.25, 25¢ to 10¢
Boardman's.....	30¢
Cincinnati Brace Wrenches.....	55¢ to 10¢
Diamond Steel.....	55¢ to 60¢
Donohue's Engineer.....	20¢ to 10¢
Eagle.....	50¢ to 10¢
Hercules.....	70¢ to 75¢
Taft's Vise Wrench.....	55¢ to 60¢
The Favorite Pocker.....	75¢ doz., \$4.00, 40¢
Walker's.....	55¢ to 60¢
Webster's Pat. Combination.....	25¢

**Wringers, Clothes—**

Am. Wringer Co.'s list, July 1, 1893.....	2¢ cash
Colby Wringer Co.'s list, Sept. 1, '91.....	2¢ cash
Lovell Mfg. Co., list July 1, 1892.....	2¢ cash
Peerless Mfg. Co., list Feb. 1, 1892.....	2¢ cash
National Wringer & Mfg. Co., list June 1, 1892.....	2¢ cash

**Wrought Goods—**

Staples, Hooks, &c., list, March 17, 1893.....	85¢ to 10¢ to 15¢
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**Paints, Oils and Colors.—Wholesale Prices.****Animal and Vegetable Oils—**

Linsed, City, raw.....	52 @ ..
Linsed, City, boiled.....	55 @ ..
Linsed, Western, raw.....	50 @ ..
Lard, City, Extra Winter.....	50 @ 60
Lard, City Prime.....	50 @ 60
Lard, City, Extra No. 1.....	50 @ 60
Lard, City, No. 1.....	45 @ ..
Lard, Western, prime.....	59 @ 28
Cotton-seed, Crude, prime.....	27 @ 28
Cotton-seed, Crude, off grades.....	25 @ 26
Cotton-seed, Summer Yellow, prime.....	32 @ 33
Cotton-seed, Summer Yellow, off grades.....	30 @ 31
Sperm, Crude.....	63 @ 63
Sperm, Natural Spring.....	63 @ 66
Sperm, Bleached Spring.....	68 @ 70
Sperm, Natural Winter.....	68 @ 70
Sperm, Bleached Winter.....	73 @ 75
Whale, Crude.....	44 @ ..
Whale, Natural Winter.....	44 @ ..
Whale, Bleached Winter.....	47 @ ..
Whale, Extra Bleached.....	42 @ ..
Sea Elephant, Bleached Winter.....	26 @ ..
Menhaden, Crude, Sound.....	26 @ ..
Menhaden, Crude, Southern.....	25 @ 26
Menhaden, Light Pressed.....	34 @ 39
Menhaden, Bleached Winter.....	38 @ 41
Menhaden, Extra Bleached.....	40 @ 41
Tallow, City, prime.....	45 @ 47
Tallow, Western, prime.....	43 @ 46
Cocoonut, Ceylon.....	54¢ @ 54¢
Cocoonut, Cochiti.....	64¢ @ 64¢
Cod, Domestic.....	38 @ 40
Cod, Foreign.....	40 @ 43
Red Elaine.....	35 @ 38
Red Saponified.....	44¢ @ 44¢
Bank.....	35 @ 36
Straits.....	38 @ 38
Olive, Italian, bbls.....	58 @ 62
Neatsfoot, prime.....	60 @ 65
Palm, prime, Lagos.....	54¢ @ 54¢

**Mineral Oils—**

Black, 20 gravity, 25 @ 30 cold test.....	7 @ 7 1/2
Black, 20 gravity, 15 cold test.....	7 @ 8
Black, 20 gravity, summer.....	54¢ @ 64¢

Cylinder light, altered.....	12 @ 16
Cylinder, dark, altered.....	10 @ 13
Paraffine, 23 1/2 @ 24 gravity.....	11 @ 12
Paraffine, 25 gravity.....	10 @ 11
Paraffine, 28 gravity.....	7 1/2 @ 8
Paraffine, red.....	9 1/2 @ 10 1/2

**Paints and Colors—**

Barytes, Foreign, 1/2 ton.....	\$22.00 @ 24.00
Barytes, Amer. floated.....	29.00 @ 32.00
Barytes, Amer. No. 1.....	16.00 @ 18.00
Barytes, Amer. No. 2.....	13.00 @ 15.00
Barytes, Amer. No. 3.....	11.00 @ 12.00
Blue, Celestial.....	25 @ 50
Blue, Chinese.....	20 @ 40
Blue, Prussian.....	25 @ 40
Blue, Ultramarine.....	8 @ 25
Brown, Spanish.....	3 1/2 @ 1
Brown, Vandyke, Amer.....	3 @ 3 1/2
Brown, Vandyke, English.....	6 @ 8
Carmin, No. 40, in bulk.....	2.00 @ ..
Carmin, No. 40, in boxes or barrels.....	2.10 @ ..
Carmin, No. 40, in ounce bottles.....	3.00 @ ..
Chalk, in bulk.....	1.75 @ 2.00
Chalk, in bbls. 100 lb.....	33 @ 40
China Clay, English.....	13.00 @ 18.00
Cobalt Oxide, prep'd.....	9.00 @ 11.00
Cobalt Oxide, black.....	1.90 @ ..
Cobalt Oxide, black, less 100 lb.....	1.90 @ ..
Green, Paris, in bulk.....	23 @ ..
Green, Paris, 170 @ 175 lb.....	23 1/2 @ 23 1/2
Green, Paris, small pack.....	25 @ 29 1/2
Rebates, 3¢ @ 10 on lots of 10,000 lb or over; 2 1/2¢ @ 4000 to 10,000 lb; 2¢ @ 2000 to 4000 lb; 1 1/2¢ @ 1000 to 2000 lb; 1¢ @ 500 to 1000 lb purchased during the season.	
Green, Chrome, ordinary.....	6 @ 12
Green, Chrome, pure.....	22 @ 25
Lead, Eng., B.B. white.....	7 @ 8
Lead, Amn. White:	
Dry.....	4 1/2 @ 4 1/2
In Oil.....	5 1/2 @ 6 1/2
Lead, White, in oil, 25 lb tin pails, add to keg price.....	.. @ 1
Lead, White, in oil, 12 1/2 lb tin pails, add to keg price.....	.. @ 1
Lead, White, in oil, 1 to 5 lb assorted tins, add to keg price.....	.. @ 2 1/2

Lead, Red, bbls. and 1/2 bbls.....	5 1/2 @ 5 1/2
Lead, Red, kegs.....	5 1/2 @ 6
Litharge, kegs.....	5 1/2 @ 5 1/2
Litharge, bbls. and 1/2 bbls.....	5 1/2 @ 6
Ocher, Rochelle.....	1.35 @ 1 1/2
Ocher, French Washed.....	1 1/2 @ 2
Ocher, American.....	1 1/2 @ 1 1/2
Orange Mineral, English.....	7 1/2 @ 8
Orange Mineral, French.....	10 @ 10 1/2
Orange Mineral, German.....	7 1/2 @ 8
Orange Mineral, American.....	7 1/2 @ 8
Red, Indian, English.....	2 @ 15
Red, Indian, American.....	2 @ 5
Red, Turkey.....	9 @ 14
Red, Tuscan.....	7 @ 10
Red, Venetian, American.....	1.10 @ 1.35
Red, Venetian, English.....	1.10 @ 1.35
Sienna, Italian, Burnt and Powder.....	4 @ 5
Sienna, Ital. Burnt Lumps.....	1 1/2 @ 3 1/2
Sienna, Ital. Raw, Powder.....	4 1/2 @ 5 1/2
Sienna, Ital. Raw, Lumps.....	1 1/2 @ 3 1/2
Sienna, American, Raw.....	1 1/2 @ 1 1/2
Sienna, American, Burnt and Powdered.....	1 1/2 @ 1 1/2
Talc, French.....	1 1/2 @ 1 1/2
Terra Alba, Frch. 100 lb.....	65 @ 75
Terra Alba, English.....	65 @ 75
Terra Alba, American No. 1.....	65 @ 75
Terra Alba, American No. 2.....	45 @ 50
Umber, Turkey, Burnt and Powdered.....	2 1/2 @ 3 1/2
Umber, Turkey, Raw and Powdered.....	2 1/2 @ 3 1/2
Umber, Turkey, B.W. Lumps.....	1 1/2 @ 1 1/2
Umber, Turkey, B.W. Amer.....	1 1/2 @ 1 1/2
Yellow, Chrome.....	10 @ 25
Vermilion, American Lead.....	11 @ 12
Vermilion, Quicks' er, bulk.....	43 @ ..
Vermilion, Quicks' er, bags.....	44 @ ..
Vermilion, Quicksilver sm'r pkgs.....	52 @ ..
Vermilion, English Import.....	55 @ 60
Vermilion, Imitation, Eng.....	8 @ 30
Vermilion, Trieste.....	90 @ 95
Vermilion, Chinese.....	85 @ 1.00
Whiting Common, 100 lb.....	40 @ 45
Whiting Gilders.....	60 @ 65
Zinc, American, dry.....	3 1/2 @ 4 1/2
Zinc, French, Red Seal.....	7 @ 7 1/2

Zinc, French, Green Seal.....	8 1/2 @ 9
Zinc, French, V. M. X.....	6 @ 6 1/2
Zinc, Antwerp, Red Seal.....	6 @ 6 1/2
Zinc, Antwerp, Green Seal.....	6 1/2 @ 7 1/2
Zinc, German, L. Z. O.....	5 @ 5 1/2
Zinc, V. M. in Poppy Oil, G. Seal, lots of 1 ton and over.....	10 1/2 @ ..
Zinc, V. M. in Poppy Oil, lots less than one ton.....	11 @ ..
Red Seal.....	3 1/2 @ ..
lots of 1 ton and over.....	3 1/2 @ ..
lots of less than 1 ton.....	10 1/2 @ ..
Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1¢; 25 bbls., 2¢; 50 bbls., 4¢. No discount allowed on less than bbl. lots.	

**Colors in Oil—**

Black, Drop, Frankfort.....	25 @ 30
Black, Drop, English.....	12 @ 15
Black, Drop, Domestic.....	7 @ 10
Black, Lampblack, Best.....	20 @ 35
Black, Lampblack, Common.....	7 @ 13
Black, Ivory.....	8 @ 15
Blue, Chinese.....	35 @ 40
Blue, Prussian.....	20 @ 45
Blue, Ultramarine.....	12 @ 18
Brown, Vandyke.....	7 @ 12
Green, Chrome.....	8 @ 13
Green, Paris.....	16 @ 18 1/2
Sienna, Raw.....	7 @ 14
Sienna, Burnt.....	7 @ 14
Umber, Raw.....	7 @ 10
Umber, Burnt.....	7 @ 10

**Putty—**

In barrels and 1/2 bbls.....	.013¢ @ .013¢
In tubs.....	.013¢ @ .013¢
In tin cans.....	.013¢ @ .023¢
In bladders.....	.013¢ @ .023¢

**Spirits Turpentine—**

In regular bbls.....	29 1/2 @ 30
In machine bbls.....	30 @ 30 1/2

**Glue—**

Low Grade.....	7 @ 9
Cabinet.....	11 @ 14
Medium White.....	12 @ 14
Extra White.....	18 @ 20
French.....	10 @ 22
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